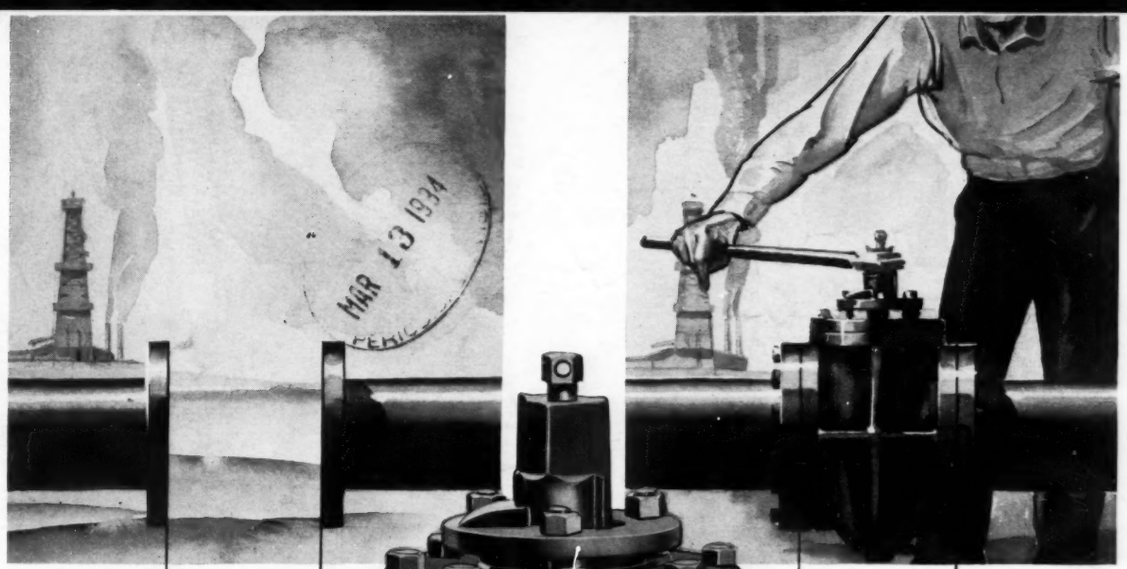
WESTERN GAS



FACE-TO-FACE GATE VALVE DIMENSION

FACE-TO-FACE GATE VALVE DIMENSION

Being interchangeable with standard gate valves, the new Emco Nordstrom Lubricated Plug Valves meet a demand in the gas industry. Differing from the standard Nordstrom line of valves, the Emco Nordstrom series has the same face-to-face dimensions as gate valves in the same sizes—available from 2" to 12" inclusive. Thus it is unnecessary to alter pipe dimensions when making replacements. The cost of these superior valves compares favorably with gate valve prices. Embodying patented "Sealdport" lubrication, Emco Nordstrom Valves offer many advantages.

TYPICAL FEATURES: Full-floating, hydraulically lubricated plug; unexposed frictionless resilient packing; elimination of long stuffing box; sealed seat, impossible for foreign matter to settle in; quarter-turn, permitting quickest shut-off; plug hydraulically sealed around valve ports with pressure lubricant, assuring positive shut-off and freedom from leaks internally and externally. Most compact housing. Ask for Bulletin V102.

MERCO NORDSTROM VALVE CO.
A Subsidiary of
PITTSBURGH EQUITABLE METER CO.
Main Offices: Pittsburgh, Penna.
Western Plant: Oakland, Calif.
Branch Offices and Warehouses in Principal Cities

EMCO NORDSTROM VALVES

have gate valve face-to-face dimensions...

EVERY sixth man employed in the J & L Seamless Tube Department is *your* man, as truly as though he were on your payroll. Five out of every six *make* J & L Seamless Pipe; the sixth man—*your* man—inspects it.

You'll find this sixth man making chemical tests of raw materials; analyzing the steel for chemical and physical properties; checking the bloom pickling; examining the seamless pipe; verifying the wall thickness; checking pitch and taper of threads; inspecting couplings; rechecking all previous inspections; testing hydrostatically, and finally going all over the finished job.

Every sixth man, *your* man, is always looking for trouble and flaws, so that you won't have to. He makes sure that rejections are made at the mill, and not in the field. He's one of the big reasons why oil men regard the "J & L" mark on pipe as a complete guarantee of uniform quality, dependable service and long-time satisfaction.

J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION
AMERICAN IRON AND STEEL WORKS
JONES & LAUGHLIN BUILDING, PITTSBURGH, PENNSYLVANIA

Sales Offices: Atlanta Boston Buffalo Chicago Cincinnati Cleveland Dallas Denver Detroit Erie Los Angeles Memphis Milwaukee Minneapolis New Orleans New York Philadelphia Pittsburgh St. Louis San Francisco
Warehouses: CHICAGO CINCINNATI DETROIT MEMPHIS NEW ORLEANS PITTSBURGH
Canadian Representatives: JONES & LAUGHLIN STEEL PRODUCTS COMPANY, Pittsburgh, Pa., U. S. A., and Toronto, Ont., Canada

The Modern BRIDGE

Here, expansion and contraction are provided for by rollers, rockers, sliding bearings, or other dependable means. All longitudinal movement may be concentrated at one spot.

The Modern ROAD

Here, expansion and contraction are provided for at short, regular intervals by joints between slabs, because all longitudinal movement cannot be concentrated at one spot.

The Modern MAIN

Here, expansion and contraction are provided for by coupling each pipe-end flexibly to the adjoining pipe-end, since all longitudinal movement cannot be concentrated at one spot.

-All Have Expansion JOINTS

DURING the construction and operation of a gas main, variations in temperature, longitudinal movement and ground friction may cause endless trouble—*unless the expansion joints are adequate.*

Construct your mains throughout with modern Dresser Couplings. Then, no matter how the pipe may "stick" or move, flexible joints will be at the right places at the right time to prevent damage. It has been demonstrated for nearly fifty years that expansion and contraction, shifting ground, vibration and other strains do not affect the permanent, *absolute* tightness of Dresser-Coupled mains.

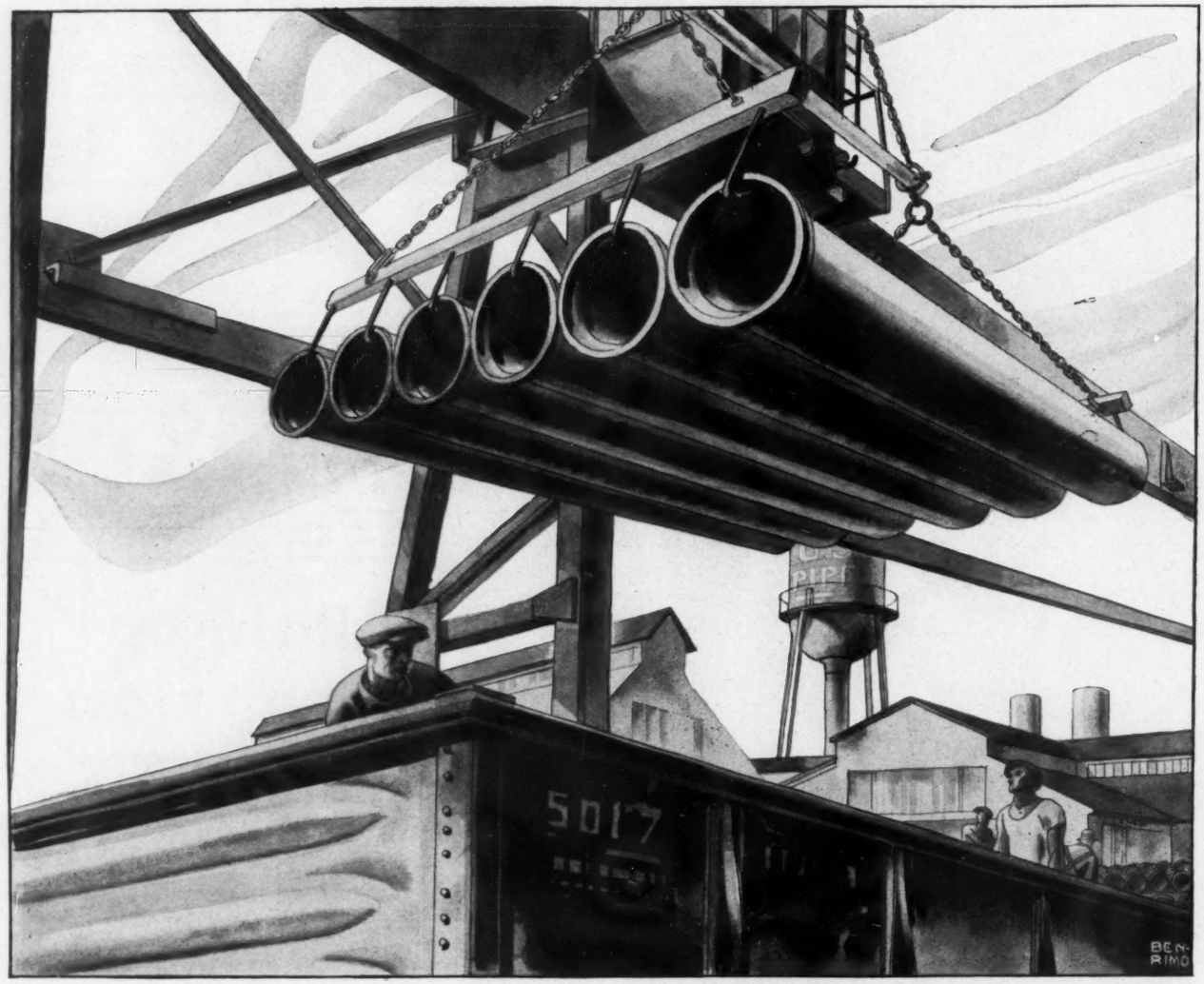
S. R. DRESSER MFG. COMPANY
BRADFORD, PA.

In Canada: Dresser Mfg. Company, Ltd., 32 Front St. W., Toronto, Ontario

DRESSER COUPLINGS

March, 1934, Volume X, Number 3. Western Gas is published by Western Business Papers, Inc., at 810 South Spring Street, Los Angeles, California. Subscription price (in advance) 25 cents the copy; $2.00 per year; 2 years, $3.00; $3.00 per year foreign. Entered as second class matter June 1, 1925, at the postoffice at Los Angeles, under the Act of March 3, 1879.

SUPER-DE LAVAUD PIPE



From The Plant

The United States Pipe and Foundry Company has taken a long step towards reducing the hazard of damage to which all pipe is subject in transit, unloading and distribution. The hazard remains beyond our control but the odds are now overwhelmingly in favor of the pipe. In Super-de Lavaud Pipe we offer a cast iron pipe endowed with maximum protection against handling hazards — a pipe that is *shatter-proofed* to the extent that

IMPACT-RESISTANCE IS INCREASED 100%

Super-de Lavaud Cast Iron Pipe is centrifugally cast by a patented improved process developed in our Research Laboratory. We have been producing and shipping Super-de Lavaud Pipe for more than a year. It has the same high tensile strength — the concentricity — the self-centering shoulder in the bell — in fact, every advantage and economy of de Lavaud Pipe as hitherto made *plus an extraordinary increase in impact resistance.*

Means Maximum Protection

To Under Ground

Thus, de Lavaud Pipe which for 10 years has rightfully been regarded as ideal pipe for service underground now becomes Super-de Lavaud Pipe with maximum protection from plant to underground. With Super-de Lavaud Pipe, the handling hazard is a negligible factor under any but abnormal conditions in transit, unloading or distribution.

It is obvious that this pipe will render super-service underground. It possesses the same high resistance to corrosion for which cast iron pipe is noted. It exceeds in all respects the requirements of the Federal Specifications Board for this product.

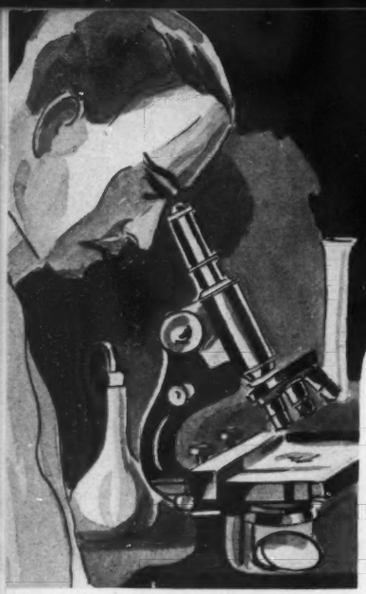
Send for descriptive booklet with complete details.

UNITED STATES PIPE AND FOUNDRY COMPANY

GENERAL OFFICES . . . . BURLINGTON, N. J.

FOUNDRIES AND SALES OFFICES THROUGHOUT THE UNITED STATES

NRA MEMBER U.S. WE DO OUR PART



0.0007 m.m. Ø

DUST AS FINE AS THIS

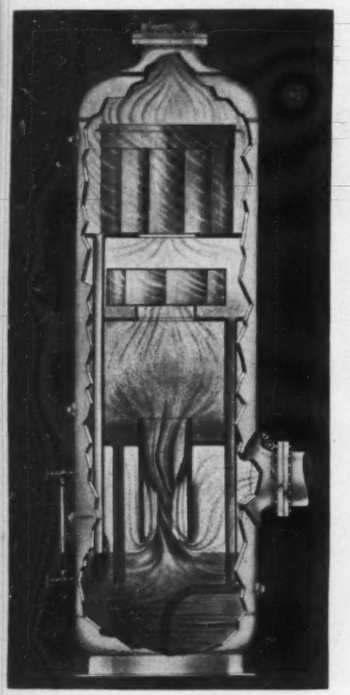
was found in an analysis of coke oven gas before installation of a **Blaw-Knox Gas Cleaner.** The complete analysis is as follows:—

98%	passes	30	mesh	screen
90%	"	60	"	"
71%	"	100	"	"
40%	"	200	"	"
20%	"	350	"	"

Finest grain measured 0.0007 mm. diameter.
70% Iron oxide.

Dust of this character is common in most gas lines. It clogs burners, cuts out valves, slows meters, increases maintenance costs and disturbs public relations.

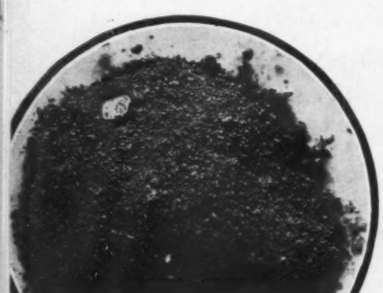
In this particular case as in many others, there has been no recurrence of dust troubles since the installation of a **Blaw-Knox Gas Cleaner.**



ut away drawing showing operation of Blaw-Knox Gas Cleaner.

Blaw-Knox Gas Cleaners offer a proven profitable investment to the transmission line operator and to the distributor of natural or manufactured gas. They protect compressors against the erosive effect of scale and sand. They insure continuity of service and increased customer satisfaction.

Let us show you specifically what we can do for your conditions.



Keep this dirt out of your compressors, valves, etc., and insure continuity of service.

BLAW-KNOX COMPANY

2008 Farmers Bank Building,
Pittsburgh, Pa.

BLAW-KNOX GAS CLEANERS

1ST IN MAJOR IMPROVEMENTS ..... IN MAJOR INSTALLATIONS ..and in ELIMINATING WIND-BLOWN SPRAY

The Flour Corp., Ltd., established in 1890, is today proud of its continuous record of achievement in the Cooling Tower field. The many thousands of FLUOR TOWERS, located in the great oil field centers of California, Texas, Oklahoma and many foreign countries, are daily proving their value in dollars saved—and in the high degree of efficiency obtained together with lowered operating costs.

The outstanding achievement in the Cooling Tower field today is the FLUOR Aerator-type COOLING TOWER, which, (1.) Eliminates Wind-blown Spray; (2.) Maintains Cooling Performance Under Any and All Weather or Operating Conditions; (3.) Requires no More Surface or Ground Area.

These new, vertical-aerator-type Cooling Towers may be operated under high-wind or still-air conditions with a maximum of efficiency heretofore thought impossible.

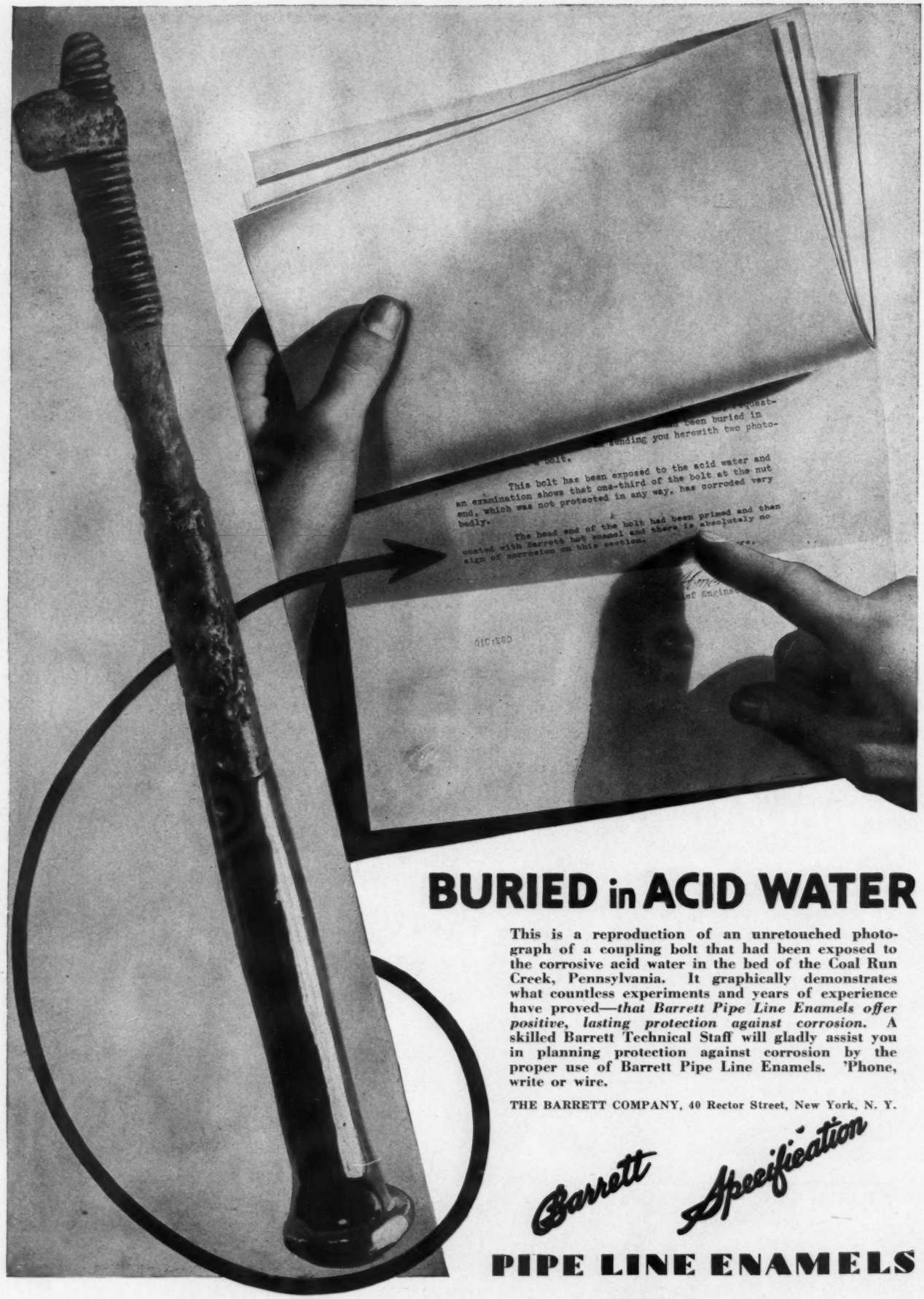
Fluor engineers are also now providing specifications for the adaption of this vertical-aerator construction to old style, Louvre-type Towers thus affording plant owners an opportunity of bringing their cooling equipment up-to-date at a minimum of expense.

VERTICAL

FLUOR AERATOR-TYPE COOLING TOWERS

FLUOR CORPORATION
LTD
909 East 59th Street LOS ANGELES, CALIF

New York, N. Y. Washington, D. C.
Tulsa, Okla. Cleveland, Ohio
Chicago, Ill.


This bolt has been exposed to the acid water and
an examination shows that one-third of the bolt at the nut
end, which was not protected in any way, has corroded very
badly.
The head end of the bolt had been primed and then
coated with Barrett hot enamel and there is absolutely no
sign of corrosion on this section.

BURIED in ACID WATER

This is a reproduction of an unretouched photograph of a coupling bolt that had been exposed to the corrosive acid water in the bed of the Coal Run Creek, Pennsylvania. It graphically demonstrates what countless experiments and years of experience have proved—*that Barrett Pipe Line Enamels offer positive, lasting protection against corrosion.* A skilled Barrett Technical Staff will gladly assist you in planning protection against corrosion by the proper use of Barrett Pipe Line Enamels. 'Phone, write or wire.

THE BARRETT COMPANY, 40 Rector Street, New York, N. Y.

Barrett Specification

PIPE LINE ENAMELS

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WESTERN GAS

"Reg. U. S. Pat. Off."

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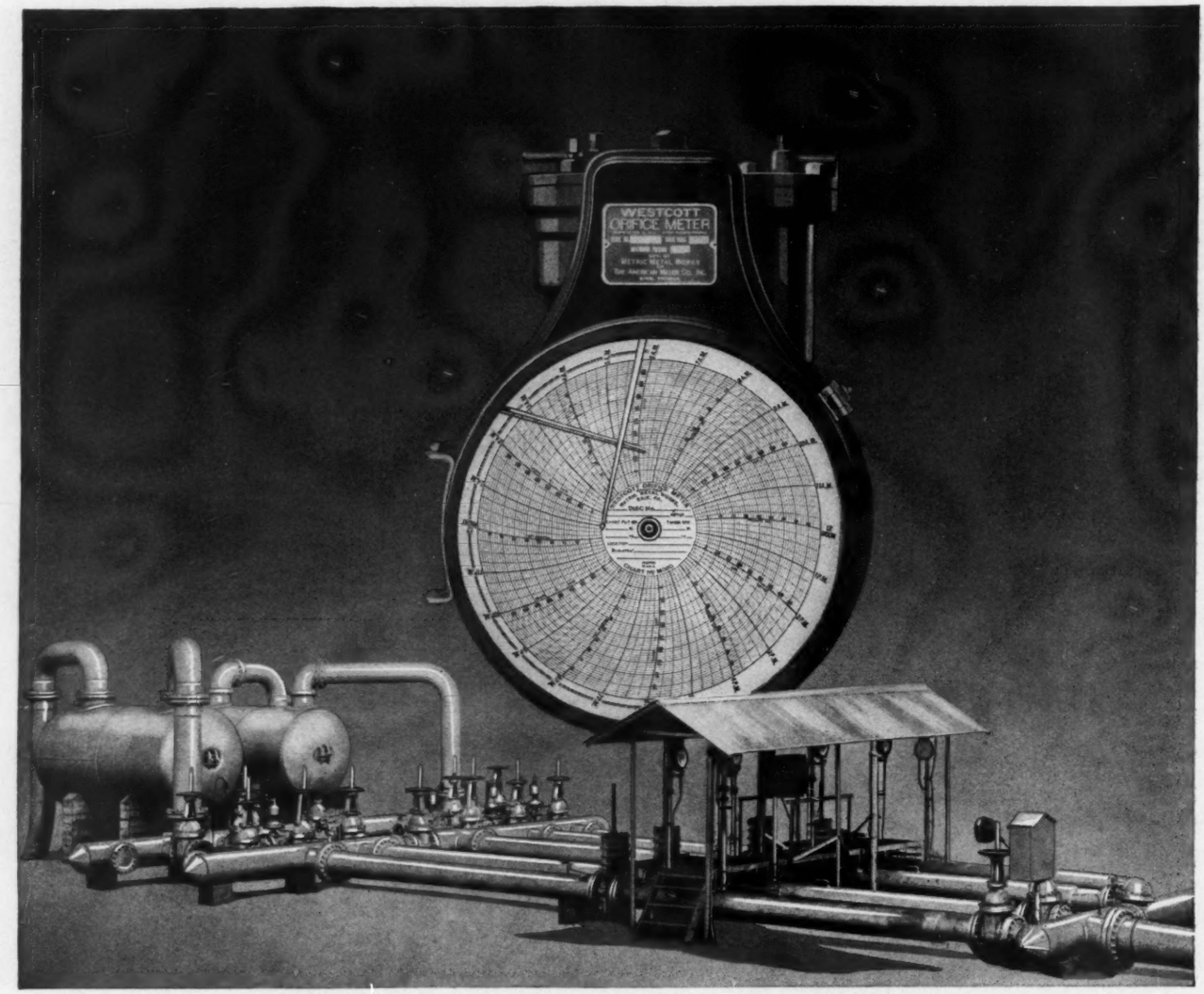

• at the Long Beach Steam Station of Southern California Edison

CAPACITY 128,000,000 CU. FT. OF NATURAL GAS PER DAY

• Four Westcott orifice meters measure all the natural gas consumed by this plant . . . which has the world's greatest installed capacity for natural gas use. • From YOUR standpoint this and the thousands of other prominent Westcott meter installations offer outstanding test cases. No more exacting "proving ground" could be devised. The accuracy, rugged simplicity and the complete responsibility of Westcott meters are just as vital to you, whether your problem lies in the measurement of gas, steam, air, oil or other fluids in volume. Catalog EG-2, which will be mailed on request, gives complete details of operation and application.

AMERICAN METER COMPANY
INCORPORATED
Measurement and control of Gas, Oil, Steam, Air and Liquids
ESTABLISHED 1836
METRIC METAL WORKS *ERIE, PENNSYLVANIA*

Albany Baltimore Birmingham Boston Chicago Dallas Denver Erie Kansas City
Los Angeles Philadelphia Pittsburgh New York San Francisco Tulsa

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March, 1934

WESTERN GAS

Vol. X, No. 3

"Reg. U. S. Pat. Off."

A Monthly Journal of the Gas and Gas Appliance Industries in *Western America*

Rural Areas Suffer When Cities Take Over Utility Function

IN a February newspaper statement Leon O. Whitsell, member of the California Railroad Commission, comments upon a little-considered aspect of municipal ownership—its effects upon rural consumers of utility services. While his remarks directly concerned farm electrification they have almost equal force for gas properties which serve numerous small communities and rural sections in addition to their metropolitan centers.

City properties cannot be divorced from utility systems without injury to all parts of the structure. Rural demand improves load factor on the whole system, particularly in cases where gas is sold for farm power needs. To separate rural from urban properties would throw a heavier burden of capital costs, operation and maintenance expenses upon both.

Breaking up utility structures through municipal city distribution is anti-social as well as uneconomic, since it removes incentive for further rural extension of utility service and places present service standards in hazard.

Municipal utility properties in California alone, said Commissioner Whitsell, are depriving the state of a million dollars annually in tax revenues. Further shifting of utility systems into municipal hands would mean further redistribution of the tax burden, and the farmer is in no position to assume additional tax load.

On the subject of tax-free municipal utilities, it is of interest to note that more than 45,000 farmers of Missouri have gone on record with the Missouri Association of Public Utilities demanding that all utilities, municipal as well as private, be placed on the tax rolls.

Action on the Sales Scene

WITH sales departments the new year is already setting a fast pace. One factor is the activity on full-automatic gas ranges, which the industry is generally accepting as the answer to the bugaboo of electric cookery in the home.

In the Los Angeles area a two-month campaign on clock-controlled ranges, now at the half-way mark, has already set up the expectation of putting 10,000 modern ranges into service. Several other sections are preparing similar campaigns and there is good reason to feel that the same type of results will be achieved. Home purchasing has been deferred for several years, during which manufacturers have made notable improvements in ranges. With purchasing habits getting back to normal the time is ideal to lay out a comprehensive program for replacement of obsolete ranges—and protect that basic kitchen load. Organization and procedure for the Los Angeles campaign, incidentally, will be thoroughly covered in *Western Gas* for April.

Another stimulus to domestic load-building in 1934 is the announcement from the A. G. A. refrigeration committee of a second nation-wide contest on gas refrigeration. From April 1 to June 30 the "go-getter contest" on Electrolux refrigerators will place many thousands of new units—protecting the gas investment in every home which they enter.

At numerous points individual company campaigns of more than local magnitude are under way or contemplated for later months of 1934. Chicago's tremendous househeating drive, described in this issue, is an example.

Dealer sales will be better integrated into the load-building program this year than ever before, and sales work of all kinds should be more productive. All in all, 1934 is off to a good start for load-builders.

Texas Resents Proposed Gas Tax

ANY move to tax natural gas, discriminating in favor of any other fuel, will be strongly protested in Texas. Last month both houses of the state legislature voted opposition to the proposed 5 cent per M c.f. federal tax for which the National Coal Association is seeking enactment. Such a tax, said the Texas solons, would increase the state fuel bill more than $12,000,000, cost pipe line and distributing companies their industrial business, and raise domestic rates to offset industrial losses.

Other natural gas producing and consuming states should be heard from in opposition to this partisan proposal.

Just Go Down the Cellar Steps to
....YOUR CABIN IN THE WOODS
THE round wood posts in this basement suggest a treatment of great appeal to the out-of-doors man whose hobby is fishing or hunting—or to the whole family, for that matter, if they are accustomed to spending vacation weeks as
All of the interior woodwork of this room is stained a dark weathered brown; the floor is painted with a dark olive green, using any available discarded rug for floor covering. Color prints of fishes, birds and animals serve as wall decorations and add further notes of color to this attractive room.

AT LEFT:

A page from booklet entitled "Your Basement" being used in 1934 Chicago area house heating campaign. Small inset at upper left is a photograph of actual basement; architect's sketch shows basement remodeled.

Selling Gas Heat Metropolitan

THE heating campaign described in the following pages has been conducted by the three companies serving Chicago and vicinity with gas; namely, the Western United Gas & Electric Co., Public Service Co. of Northern Illinois and the writer's own company, The Peoples Gas Light and Coke Co. of Chicago.

About January of 1933 the management of these companies decided that the worst of the depression had passed and that there really would be an improvement in business conditions in the spring or summer of 1933. For this reason they deemed it an opportune time to launch a real drive for new business in the heating field by early summer. There were many obstacles to be overcome and considerable planning to be done before the sales drive could be started, so that it was nearly May before our plans really began to take shape. Being most familiar with the operations in The Peoples Gas Light and Coke Co., I shall deal with the campaign from our angle, and I believe that pretty much the same procedure was followed in the other two companies.

During the year of 1932 we had done only a small amount of advertising of gas heat and had in the field some 25 salesmen who sold 777 installations. The average gas rate during 1932 was approximately 9c per therm, and the average price for tank wagon fuel oil was 5½c per gallon. In other words, gas for heating in Chicago was 75 per cent higher than oil. The new rate for gas announced in the early summer of 1933 for the average home was 7½c per therm. The actual rate set up is as follows:

First 2 therms	.58	per therm
Next 24 therms	.158	per therm
All over 26 therms	.07	per therm

In the meanwhile oil had advanced to 6½c per gallon; so that now a therm of gas was to be sold at a 15 per cent premium only above oil. Our entire organization was easily sold the idea that gas was worth more than this 15 per cent premium.

The management of the company made a liberal appropriation for the greatest advertising effort that has ever been attempted in the selling of gas heat. The Peoples Gas quota for 1933 was set at 10,000 installations, and we estimated that to get this many sales we would have to employ 150 salesmen.

We divided Chicago into six sales divisions, each in charge of a sales director, then again divided each division into five districts, each in charge of a gas heating engineer who also acted as crew manager. In most cases these engineers were our old experienced gas heating salesmen, upon whom we felt we could rely to see to it that the proper equipment was sold for the job and correct estimates given to buyers. Then we divided these districts, 30 in all, into 150 territories and employed experienced, door-to-door salesmen to work these territories. As most of these salesmen were not experienced in selling gas heating equipment, we organized a school for salesmen that lasted about a week, and put the entire group through a course that we felt would give these men the necessary knowledge to talk gas heat.

It was decided that it would make the selling easier if we could have a flat price for a burner that would fit the large majority of our jobs. We therefore selected several different makes of burners with a capacity up to 240,000 B.t.u. input per hour, and offered them at the flat price of $149.50, whether the job required controls for warm air, steam or hot water. This offer was made on a very simple form of rental purchase agreement, under which the customer agreed to make no down payment, no installation charge, and pay only $3 per month rental for the burner during nine months of the first 12 months' period. At the end of the first 12 months, the contract automatically becomes a purchase agreement and subsequent payments are to be made at $3 for each month of the calendar year plus 6 per cent per annum carrying charge

W. R. Evans

in Chicago

By W. R. EVANS

New Business Manager
The Peoples Gas Light & Coke Company
*Chicago, Illinois**

Members of House Heating Sales Division No. 1, first place winner in 1933 Chicago area campaign, photographed during the winter sales conference held preparatory to the 1934 house heating drive.

on the unpaid balance, unless the customer should elect to make larger monthly payments, or decide to pay the entire balance in full. It is interesting to note that, notwithstanding this very liberal offer, occasionally we found a customer who preferred to pay the $149.50 cash at the time of installation of the burner. On this regular standard package job, as we called it, the rates of commission were as follows: salesman, $16; engineer, $4; director, $2. Seventy-five per cent of these commissions were paid at the end of the month in which delivery was made and the 25 per cent balance placed in a reserve fund against which deductions were made for removals occurring before the customer had completed four monthly payments.

On July 18 all of the Chicago newspapers carried full page advertisements announcing the launching of the heating campaign. On the following day the complete organization of 150 salesmen, 30 engineers and six sales directors took the field prepared to follow up the barrage laid down by the tremendous newspaper display and radio shorts of weather reports and time signals. These broadcasts were on the air throughout the day from five radio stations, and sounded to the housewife something like this: (This sample is, of course, a January broadcast.)

SAMPLE RADIO MESSAGE

Weather forecast for Chicago and vicinity is: Mostly cloudy and colder Thursday, probably snow and rising temperature Friday. (Open continuity with a long whistle of the wind.)

Boy, that sounds cold, doesn't it? Just think of leaving that nice warm comfortable bed these snappy cold winter mornings and putting your feet on that icy cold floor. Brrrr!

Wouldn't it be wonderful to wake up in a nice comfortable cozy house where you could dress in comfort, shave in comfort, eat breakfast in comfort? Well, that's what gas heat brings you—all the comforts of a hotel from the minute you open your eyes in the morning—no matter how bitter cold the weather.

It will pay you in comfort, convenience and health to get the facts on new low costs for gas heat in Chicago and most of the suburbs and special trial offer to install.

Copy above was flashed on 12,000 car and bus ads and 800 billboards in the Chicago area.

In addition to the large newspaper and radio coverage, a gas heat message was flashed on 800 poster and painted billboards in the Chicago area. We also used 12,000 car and bus ads, return postcard enclosures with the gas bills, and attractive window displays in our Main Office at Adams Street and Michigan Avenue, and in the 52 branch offices of the three companies.

The selling started off at only a fair pace, say about 10 per day, but in about two weeks we saw that 50 jobs a day was not too much to expect in the very near future. In fact, for the period from July 19 to July 31 The Peoples Gas Co. sold 117 jobs, and for the balance of the year the sales were as follows:

August	1422
September	3168
October	3090
November	748
December	498

giving us a total from July 19 to December 31 of 9,043 jobs net after deducting cancellations, or 10 per cent less than our quota. From July 19 to January 31 we removed 862 burners, mostly because the customers had lost their employment or suffered financial reverses and not because of any dissatisfaction with gas heat. The large majority of these removals were running below our yearly cost estimates. The Pub-

(Continued on Page 40)

*Presented at the Mid-West Regional Gas Sales Conference held February 15-16 at Chicago.

RECONNECTING *Domestic Customers*

By STANLEY JENKS

Manager, Residential Sales Department
Northern Indiana Public Service Company
Hammond, Indiana

INTRODUCING his address on "Customer Load Expectancies" at the Mid-West Gas Regional Sales Conference held at Chicago last month, Mr. Jenks held up some of the industry's vital statistics for consideration, with particular reference to manufactured gas. From October, 1929, to October, 1933, this branch of the industry lost almost 500,000 residential customers; its sales dropped 2½ million M c.f. monthly and its revenue loss per month was 3½ million dollars. Natural gas losses would probably be in proportion.

Part of the story behind these statistics is that of disconnected services which, with the now generally improved conditions, may represent a quick potential source of increase where proper campaigns for reconnections are conducted. Mr. Jenks points out that present annual residential revenue for the manufactured gas companies would be increased almost 16 million dollars (5.2 per cent of the 1933 residential figure) by regaining customers served in 1929.

Northern Indiana Public Service Co. recently concluded an outstandingly successful activity for reconnecting old customers, and the portion of Mr. Jenks' address describing this reconnection campaign is published below.—*Editor.*

WE, in the Northern Indiana Public Service Co. have every reason to appreciate the importance of the basic load. We serve with gas a territory of approximately 18,000 square miles including such industrial centers as the Calumet region (Hammond, East Chicago, Whiting and Indiana Harbor), South Bend, Fort Wayne, Michigan City, Elkhart and several other cities with more than 5,000 population, and normally industrially active. We faced the full blast of the depression. From a survey made in January, 1933, we found that we had in all, roughly 30,000 inactive residential services out of an available total of 126,600 services. Imagine the top of the Grand Canyon as our 1929 revenue point, think of the walls of the canyon and you have an idea of how our revenue curve was looking by the middle of 1933. Industrial sales, due to the characteristics of the territory served, were a greater factor in our total sendout than in the average company. When the depression hit us, ours was a dual loss because we lost both the industries' load and that of the workers who were no longer employed by these industries. It was a very bad condition and all previous rules of credit, utility sales promotion, etc., had all been shot full of holes. Early in May, we went into a huddle and out of it came a company-wide campaign to go after the reconnection of "dead" gas services. We defined a "dead" service as one that had been out of use for six months (since February 1, 1933) and had not been discontinued for non-payment, or any ex-customer shut off for non-payment prior to February 1, 1933 if he would agree to pay current bills plus one-twelfth of the delinquency monthly until paid off. No new customer requiring a service run was regarded as eligible for inclusion in this activity. We had found, in surveying our ex-customers, that the unsurmountable barrier for most of them was the payment of the delinquent amount in one lump sum prior to reconnection. Because of their many public contacts, the entire campaign was made an operating employees' activity. The major objective was the reconnection of "dead" services with the following minor objectives added:

A. Additional revenue without capital investment.
B. Collection of delinquent bills otherwise uncollectible at the time.
C. The creation of a first class opportunity to—
   1. Educate our employees in the necessity for more gas sales.
   2. Teach them the selling points of gas as a superior fuel.
   3. Give our employees an opportunity to earn more money.

To induce an inter-district competitive spirit, we set up equitable tasks for districts based on such local characteristics as—

1. Existing percentages of "dead" services, because the smaller percentage the harder it would be to secure additional customers.
2. The length of time the community had been "gassified," thereby taking into account the fact that newer "gassified" communities were more fertile, because in the older communities it was a fair assumption that "non-users" had been sold the merits of gas service but for other reasons were not using it.

Such classifications made us divide our various operating districts into groups of similar status and a group prize of 50c per reconnected "dead" service was awarded to the member of each group securing the largest percentage of its established task. In addition, in all districts we set up a jackpot prize of $2 for each reconnected service. This jackpot was disbursed entirely at the discretion of the district manager, who in most instances set it up in competitive prizes for his local organization.

July and August normally are fairly inactive sales months. These two weren't. Our task was 1,408 "dead" services. Through this activity we reconnected 3,035 "dead" services! Using the average of $32.50 annual revenue per customer which is our company average, we added $98,350, or approximately $100,000 annual revenue. To this we might claim another $64,000 added annual revenue, for we also added about 2,000 more residential customers who did not come within our "dead" service classification.

So much for our major objective. Our collections of delinquencies amounted to $13,351.52 of which $2,108.34 was collected before reconnection. Our total direct expense was $10,531.23. Our employee bonuses and prizes were approximately $7,000 and our direct and indirect advertising costs $3,100, the balance of the expense, approximately $500, being for dealer bonuses and trade-in allowances on the sale of approved gas ranges by our associated dealers. Among the indirect benefits in our so-called combination districts we should mention that there was a distinct pick-up in reconnected electric customers. This, we feel, was neither accidental nor incidental. The most important factor in the whole activity is that we regained this business at about a 10c to the dollar ratio and did not have to invest a penny in capital expenditures to do it.

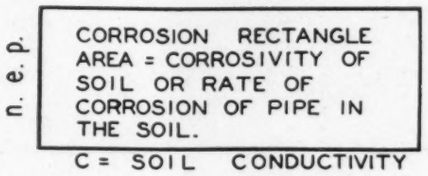


FIG. 1

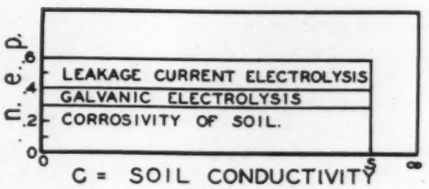


FIG. 2

Some Facts and "Futures" in Connection with

Pipe Line Corrosion

THROUGH THE informal "question and answer" method the author presents a number of conceptions bearing upon present and future trends in the mitigation of corrosion losses. The general reader will find more than a little interest in Mr. Williamson's remarks.—*Editor.*

By B. A. WILLIAMSON

Electrolysis Engineer
Los Angeles Gas and Electric Corporation

THE corrosion problem is old, dating back to Tubal-cain. The losses which it causes are great, being next to those which affect human life. Until recent years the corrosion engineer has done little more than to mark time.

This paper is addressed to the pipe engineer whose active interest and valuable practical knowledge are needed in the solution of corrosion problems. It is addressed to the corrosion engineer. Our problems are difficult and it is desirable that we swap ideas. Since science has ever advanced step by step along a way paved with new theories any new idea may possess real value as a stepping stone. It is proposed to ask and discuss pertinent questions relating to soil corrosion.

Why has the corrosion engineer failed?

The corrosion phenomena being very complex, he has developed an inferiority complex, thinking he was called upon to do the impossible. As a result, he has not acquired the necessary technique and apparatus to do his work.

Why his poor technique?

The pipe companies are partly responsible in starting him wrong. Knowing that corrosion was defined as an electro-chemical decomposition, they hired an electrical engineer to solve their electrolysis problem under the impression that it had an *electro*-chemical complexion; when their difficulty was soil corrosion they called a chemical engineer thinking it was electro-*chemical* in nature. The result was that the first engineer has been hobbling along on his left foot and the second on his right when otherwise they might have gotten together to go places.

No, corrosion is not a double barreled affair that can be fired, left or right. It has, it is true, two barrels; they are not joined together by a hyphen but are separated by one thus in the statement of Ohms law

$$I = \frac{E}{R} \quad \text{(Equation 1)}$$

As every high school boy should know, this law applies to the solution of problems in simple electric circuits, including those of electrolysis problems. For some unaccountable reason the engineer has not until now attempted to apply it to solid corrosion problems. In my estimation this may account somewhat for his failure.

This law, expressed in ordinary language, means that the electric current (I), or the rate of corrosion, is directly proportional to the normal equilibrium potential (n.e.p. or E) of the iron, and it is inversely proportional to the resistance (R) of the soil. Now this law can be written to mean exactly the same thing in a slightly different form which is sometimes more convenient to handle.

For instance, for the quantity $\frac{1}{R}$, we can substitute the symbol C which stands for the conductivity of the soil.

The equation now reads:

$$I = EC \quad \text{(Equation 2)}$$

Translating again, this means that the corrosion activity increases directly with both the n.e.p. of the iron and the conductivity of the soil. The phenomena of corrosion occur in three zones, distinct and separate, one from one another, viz: metal, soil or electrolyte, and the surface of contact between them. The voltage is generated in the latter and the resistance is encountered in all three.

Wherein does the corrosion engineer lack the necessary apparatus to do his work?

His duties may be compared to those of a physician. His arts are not constructive but preventive. His first task is to diagnose and his next is to prescribe. If he cannot do the first, neither will he do the second. The questions most frequently asked by the management are: "How corrosive is the soil?"; "How fast is corrosion proceeding on that pipe?"; and "What shall be done to retard it?".

No questions are more important and few more difficult. In our difficulty, suppose that we apply equation 2: $I = EC$. This states that the corrosion activity, whether it be residual in the soil or the actual rate suffered by the pipe, is theoretically a quantity of two dimensions. It, therefore, may be represented by the area of a rectangle whose length is the conductivity of the soil and whose width is the n.e.p. of iron in that soil. (Fig. 1).

The chemical engineer once worked with test tubes trying to find the metal pressure of iron, seeking to determine the corrosive power of soil. Now he

measures with various sorts of electrical apparatus either the resistance or the conductivity of the soil, for the same purpose. In other words, he has been on the outside measuring one side or the other of his corrosion rectangle when he should have been "on the inside" measuring its area. If he did not choose to be scientific, cared little for accuracy, and thought it was easier to scale off one of the two dimensions, he displayed good judgment from the standpoint of practical accuracy to select the side rather than the end. This is because the conductivities of the soils vary between much wider limits than do the n.e.p's. Another important reason will be presented later.

Referring to the second question, it might appear that if the corrosivity of the soil was known, the actual rate of the corrosion of a pipe in that soil could be prognosticated. This is not true since there are usually present on the pipe, or on other pipes with which it is connected, certain extraneous factors, such as potentials due to mill scale, rust films, and foreign metals. The two forms of rust, ferrous and ferric, are outstanding malefactors which must be taken into consideration.

Do you suppose it possible to build a single apparatus that would measure both the corrosivity of the soil and the rate of corrosion of bright pipe surface exposed to that soil?

If I were to try, it would be to follow the design of the well known Shepard rods, which are used to measure the resistivity, or the conductivity, of the soil. There would be but little difference except to determine and to apply the true value of the n.e.p. The anodic electrode would be 1/18 as large as the negative electrode, because this is the approximate ratio of the anodic to the cathodic surfaces on a pipe line. No effort would be made to avoid the polarization resistance effect since it exists in actual corrosion and greatly affects it.

In using this suppositional apparatus, to measure the actual rate of corrosion on bright exposed pipe surface, whose potential is influenced by extraneous factors such as rust, leakage currents, etc., it is necessary to increase the width of the corrosion rectangle accordingly. To illustrate, in Fig. 2, the corrosivity of the soil is laid off as S, and the n.e.p. of bright iron, rust and mill scale, and leakage currents are measured off as 0.3, 0.1, and 0.2 volt respectively.

How should this apparatus be calibrated?

To read in thousandths of an inch of penetration per year.

Does not the galvanic current greatly complicate the solution of the corrosion problem and add to the losses? And can you show how the galvanic current is caused to flow?

Yes, and too much consideration cannot to be given to it on that account.

In Figure 3a, A and C represent two pipes of which A, for some reason of inequality, either in the metal or the soil,

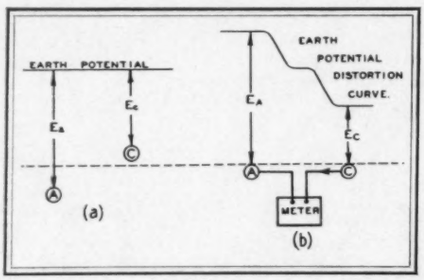


FIG. 3

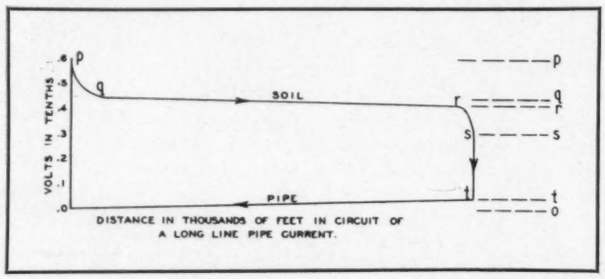


FIG. 4

has a higher n.e.p. than C. These n.e.p. values are given as Ea and Ec. Suppose now the pipes are put into metallic contact either by a wire run through an ammeter, or by a pipe. This brings them nearly to the same level (Figure 3b) but pulls each out of its normal equilibrium potential with respect to the soil. A tries to restore its equilibrium by discharging positive ferrous ions more rapidly which lifts the potential of the soil so that the difference between pipe and soil is now greater than it was before in the ratio of

$$E_A : E_a ;$$

and in a like manner C discharges ions less rapidly and its n.e.p. is reduced from its former value in the ratio

$$E_C : E_c .$$

For every ferrous ion that goes into the solution carrying two positive unit charges four hydrogen ions carrying an equal quantity of positive electricity must plate out of it on the surface of pipe. There being a lesser counter electromotive force at C than at A, a greater number of the hydrogen ions will plate out on the cathodic surface of C. Thus we conceive of an excess quantity of positive electricity entering the solution at A and an equal quantity leaving it at C causing the current in the ammeter circuit to flow in the direction of C to A.

Galvanic Current

What is Ohms law expression for the galvanic current?

$$I = \frac{E_A - E_c}{R_s + R_m + R_i + R_p}$$

where R_s is resistance in soil, R_m is the resistance in the metallic circuit, R_i is the resistance of the insulation, and R_p is the resistance due to polarization.

To what extent does the galvanic current intensify the attack?

The pitting factor is the ratio of the maximum penetration to the average penetration. It varies between the limits of 2 and 40, the lower being for bare pipe in high resistance soils and the upper for insulated pipe in low resistance soils. The average value is perhaps about 18. Thus the galvanic current increases the effectiveness of the attack from 20 pounds of iron per ampere-year quantity of electricity to 360 pounds.

Why is this average pitting factor 18:1 and not some other, say 100:1?

Apparently this question, which it seems to me is important, has never been raised before. The ratio of the areas of the cathodic to the anodic pipe surfaces, which are created by the long line current, are about 18:1. In attempting to account for this ratio in the two phenomena, it is noted that the ratio of the electrochemical equivalents of the metallic iron decomposed and the metallic hydrogen plated out on the surface of the pipe is also 18:1. The term of electro chemical equivalent refers to the weight of a metal that a given quantity of electricity will decompose. This may be a mere coincidence and, perhaps, after the corrosion phenomena are better understood it may be our explanation of the pitting factor being 18:1.

What does a graph of a galvanic current look like?

In Fig. 4 the vertical distance OP represents the n.e.p. of the pipe in the anodic zone and st the n.e.p. of the pipe in the cathodic zone. The difference between them, equal to the sum of pq, qr, rs and 'to', is the potential which causes the current to flow where pq and rs are the potential drops in the soil in planes perpendicular to the pipe, qr is the drop in the soil in lines parallel to the pipe, and 'to' is the drop in the pipe.

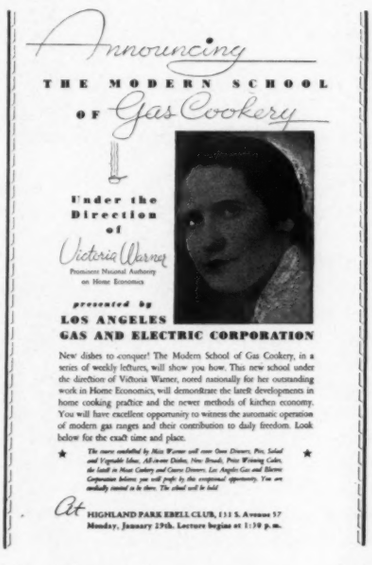
Can the galvanic current be measured?

Yes, by applying Ohms law in the drop of potential method. The McCollum earth current meter is used on the pq and rs drops in the soil, and a low

(Continued on Page 32)

Los Angeles Gas and Electric Corp. is putting out the "standing room only" sign at its newly launched series of cooking schools. Shown at the right is an audience attending the January 26 school held at the Carlton Theatre in cooperation with a local community newspaper.

Conducting a Modern School *of* Gas Cookery


Announcing
THE MODERN SCHOOL
OF Gas Cookery
Under the Direction of
Victoria Warner
Prominent National Authority on Home Economics
presented by
LOS ANGELES
GAS AND ELECTRIC CORPORATION
New dishes to conquer! The Modern School of Gas Cookery, in a series of weekly lectures, will show you how. This new school under the direction of Victoria Warner, noted nationally for her outstanding work in Home Economics, will demonstrate the latest developments in home cooking practice and the newer methods of kitchen economy. You will have excellent opportunity to witness the automatic operation of modern gas ranges and their contribution to daily freedom. Look below for the exact time and place.
At HIGHLAND PARK EBELL CLUB, 131 S. Avenue 57
Monday, January 29th. Lecture begins at 1:30 p. m.

Liberal advertising supports L.A. G. and E. cooking school program.

THE new and extensive load-building campaign of the Los Angeles Gas and Electric Corp., includes as not the least important of its promotional activities, the organization and presentation of numerous gas cooking schools throughout its territory during the year.

These schools are known to the public as the Modern School of Gas Cookery, and are under the supervision of Miss Jessica Taylor, home service director for the company. They cover periods of six to eight weeks in each district. Classes are held in the auditoriums of roomy theatres or club houses, and usually are in session once a week from 1:30 to 4:30 in the afternoon. The public is invited and regular advertising in local newspapers provides interested readers with accurate information about the school programs.

Miss Victoria Warner, home economist and cookery expert of national repute, has been engaged to conduct personally the Modern School of Gas Cookery. As Miss Warner is also an authority and expert on the mechanical operation and structure of the new automatic, clock-controlled gas ranges which are used in the cooking schools, her class lectures combine instructions in modern cooking methods and operation of the modern gas range.

The Modern School of Gas Cookery is not a prosaic, humdrum institution. Proper attention is given to stage settings, dramatic presentation, and entertainment. Hearty cooperation of newspapers and food concerns has played an important part in the success of these schools which are attended by as many as 1,200 women, according to the capacity of the auditorium. The schools have proved so popular that many women find it necessary to come early, and bring their lunches in order to be assured of a seat. Hundreds are turned away at the doors every week.

On the larger stages, two new clock-controlled gas ranges are set. In many cases a large-dial gas meter is connected to one of the ranges in full view of the audience. A blackboard is used to illustrate the reading of the meter, to estimate quantities of gas burned, and to calculate the cost of the fuel. Such demonstrations have proved impressive and clearly show the comparative economies of cooking methods. In one cooking school lecture this point was illustrated by placing potatoes in an uncovered saucepan in a large quantity of cold water and cooking them over a full gas flame. When the potatoes were done, the meter was read and result recorded on the blackboard. This method consumed 7 cu. ft. of gas. Later, potatoes of the same weight were placed in a covered saucepan in which was poured a minimum amount of hot water. The pan was placed over a full flame for two minutes which brought the water to a vigorous boiling point, at which time the gas flame was reduced to almost its minimum. When these potatoes were cooked, a second meter reading was taken, showing only 5 cu. ft. of gas had been consumed.

Each lecture at the Modern School of Gas Cookery is a complete lesson. One phase of cooking only is treated, and printed recipes giving details of procedure are distributed to the audience. The printing of the recipes is arranged so that each recipe may be cut out and conveni-

(Continued on Page 45)

DISTRIBUTION

Uniform Service Policy for Los Angeles Area

● **UNIFORM PRACTICE in Servicing Domestic Appliances, recently adopted by the companies serving the Los Angeles Metropolitan Area, in agreement with California Master Plumbers Association and Southern California furnace and water heater manufacturers—as reported by Pacific Coast Gas Association, 447 Sutter Street, San Francisco, Clifford Johnstone, managing director.—(Abstract):**

LABOR involved in giving adjustment service and in the installation of replacement parts hereinafter authorized, shall be furnished without charge to the consumer.

Free adjustment service shall consist of supplying the labor only pertaining to the following adjustments:

a. Gas Ranges.

1. Each utility shall render complete free service on gas ranges.

b. Water Heaters

1. Each utility shall make all necessary burner and minimum flame adjustments. On thermostats the service shall be limited to making simple adjustments only, if such adjustments may be readily made. Where the heater is evidently old and in need of repair or where there seems to be a possibility that an attempted adjustment of the thermostat may result in damage to the heater, the consumer is to be advised to call a plumber to have such an adjustment made and, whenever possible, a call-back should be made.

c. Warm Air Furnaces (Central, Unit, Floor, and Duplex Register).

1. All main and pilot burners, and relocate pilot lines where necessary.

2. All gas-supply apparatus which is an integral part of the appliance, such as manifolds, burner cocks, etc. (not including electric control valves).

d. Space Heaters (Warm Air Conditioners, Wall Heaters, Radiant Heaters and Gas-Steam Radiators).

1. Each utility shall render complete free service on space heaters. No adjustment or repairs will be made on appliances of an obsolete or unsatisfactory type which cannot be put into satisfactory operating condition.

e. Gas Refrigerators.

1. Each utility shall give complete free service on gas refrigerators. After the expiration of the warranty parts will be replaced at a uniform charge to be determined from time to time by representatives of the three utilities.

All appliance parts not definitely priced on current parts list shall be charged for at company warehouse cost.

Applications for reconnecting appliances other than refrigerators should be discouraged, and consumer encouraged to have a plumber do the work; except where gas utility employee makes the request, or work is already being done on the premises.

New England Practice on Free Service

● **GORDON G. HOWIE, manager, Cambridge Gas Light Co., Cambridge, Mass.; addressing recent Worcester meeting of operating Division, New England Gas Association—(Abstract):**

SUMMARY of questionnaire answers representing a good cross section of free service now given in New England:

On Request Basis: All companies give labor and parts free on appliances sold by themselves and while within the guarantee period. In addition to this amount of service, simple adjustments of pilot lights and burners are given on any gas appliance.

Approximately 80 per cent of the companies go further than this and give labor free and charge for the materials used when outside the guarantee period. In a few companies minor parts are given free. Three companies state that, while labor is free, parts are charged for at list or 50 per cent mark-up over cost price.

A minority of the companies, approximately 20 per cent, after the appliances sold by them have exceeded the guarantee period, charge for both labor and material on service work on any appliances, whether or not sold by them, unless the work consists of minor adjustments of burners.

Subject to the above stated restrictions, there appears to be no distinction made by any company on service on appliances sold by the company and appliances sold by outside dealers.

On Routine Basis: Approximately half of the companies give inspection service at regularly stated intervals in addition to the customers' request calls. House heating seems to come first in this sort of service, with water heating and commercial appliances closely following.

Refinements in Automatic Steam Injection

● **W. C. BEGEEBING, C. J. Tagliabue Mfg. Co., Brooklyn, N. Y.; addressing Mid-West Gas School and Conference, Iowa State College, Ames, Iowa, November, 1933; topic "Progress in Saturation Control"—(Abstract):**

THE desirability of humidifying natural gas, particularly in a former manufactured gas system, is affirmed by experiences of gas companies during the past five years. The principal benefits are reduced leakage and improved meter accuracy.

Principle used is differential pressure set up by "wet and dry" bulb thermometers of the recording type. Original installations functioned dependably, but latest refinements have improved equipment and reduced operating expense and supervision.

Thermometers are installed in by-pass or sampling line, dry bulb direct in line and wet bulb in accessible, high velocity housing; both thermometers shielded from radiation by hollow Bakelite cylinders.

Recording chart shows dry bulb temperature and depression of wet bulb; controller mechanism is actuated by this depression and therefore compensates and needs no adjustment for moderate temperature changes. This mechanism, adjustable to maintain any desired "depression," operates steam valve to inject necessary amount of steam. The steam valve is equipped with high lift V-port semi-balanced valves, and spindle giving minimum stuffing box friction.

Meter-Regulator Station at Crockett

Pacific Gas and Electric Co., San Francisco, Calif., is planning the installation of a meter and regulator set-up on the lines of Standard Pacific Gas Line Inc. at Crockett, Calif. Gas will be measured to the Coast Natural Gas Co. for delivery to the C. & H. Sugar Refinery near there. The Coast Natural will lay a short 8-inch line to connect the meter station to the sugar refinery.

PLANT PRACTICE

Mid-West Experience With Oil Fogging

● **C. A. BLAND, superintendent of manufacture, Des Moines Gas Co.; presented as part of discussion on oil fogging at the Mid-West Gas School and Conference, Iowa State College, November, 1933—(Abstract):**

ANSWERS to questionnaire on oil fogging, sent to Mid-West gas companies:

Total Number of Companies: 42

Kind of Gas:
Natural 23 Mixed 16 Mfg. 3

Miles of Mains:
Minimum 27 Maximum 2581

Do You Fog Gas?
Yes 36 No 5 Discontinued 1

Type of Fogger Used:
Cold 18 Hot 13
Both 4 Saturator 2

Where Located:
Works 21 Sta. Gov. 11 Both 3

Quantity Used:
2-3 gal. 23 5-10 gal. 6 Over 10 gal. 6

Distance Fog Traveled:
2 miles 17 4 miles 3
6 miles 2 10 miles 4

How Was Dist. Determined:
Filter paper 19 Dye 4
Condition of Mains 9

Which Is More Efficient:
Hot 13 Cold 5 Don't Know 17

Pressure:
High 1 Int. 11 Low 26 All 9

Miles of Main per Fogger:
25 to 100 miles—16
100 to 200 miles—3
200 to 300 miles—1
Over 300 miles—2

Summary:

Helps unaccounted-for	13 companies
Helps diaphragms	7 companies
Water vapor saturation also necessary	8 companies
Did not help unaccounted-for	1 company
Fogging not satisfactory	1 company
Prevents dust	9 companies
Velocity a factor	3 companies

Community Natural Managers Form "Big Four Managers Club"

Managers of the Abilene, Sweetwater, Brownwood and Eastland divisions of the Community Natural Gas Co., which headquarters at Dallas, Texas, in January organized the "Big Four Managers' Club," with C. C. Redding of Abilene elected chairman, and W. P. Stone, Sweetwater, secretary. One of the purposes of the organization is to promote load building work in the territory concerned.

Surplus Pressure Used for Mixing at Syracuse

● **H. K. SEELEY and T. C. MORAN, Syracuse Lighting Co., Syracuse, N. Y.; addressing Mid-West Gas School and Conference, Iowa State College, November, 1933; topic "The Syracuse Power Mixer"—(Abstract):**

COMPANY was confronted with necessity of mixing natural and manufactured gas, requiring additional pumping equipment to satisfy increased sales volume and compress the manufactured gas up to mixing and distribution pressure. This indicated considerable capital investment. Calculations showed, however, that there was, at least for the greater portion of the time, sufficient potential energy in the natural gas to furnish the necessary compression and mixing energy. This suggested combination of natural gas turbine and centrifugal pump compressor and mixer for the manufactured gas, with both units combined and automatically controlled.

The problem was turned over to Ingersoll-Rand Co. engineers, who designed and produced a unit called the Auto-Dynamic Gas Mixer. This unit has been in operation for about six months, and at the present rate of saving it is expected to pay for itself within the first year in operating costs alone, apart from saving in capital investment.

The mixer consists of a single stage power element and a four stage centrifugal compressor unit, on a common shaft and in a common casing. Power is natural gas expanded through nozzles formed by guide vanes located circumferentially around the turbine wheel. The vanes are movable, as a unit, controlled externally by rack mechanism. This movement increases or decreases areas of nozzle openings directing gas upon turbine wheel, thus controlling power input. Natural and manufactured gas are thus mixed under pressure in the common casing, and can be further mixed with by-passed natural gas if necessary.

Pressure and B.t.u. control is obtained by automatic operation of the power turbine guide vanes. No serious operating difficulties have been encountered.

Operating Data:

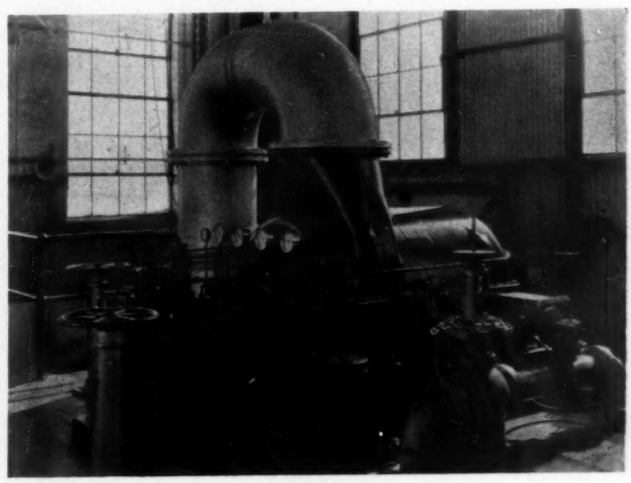
Maximum rating: 2,000,000 cu. ft. per hr. of mixed gas.
15 lbs. discharge pressure mixed gas.
7650 R.P.M.; 575 H.P.
37 lbs. natural gas intake pressure.
5 inches water manufactured gas intake pressure.
25 per cent manufactured gas in mixed gas.

Present Operating Conditions (October 24, 1933):

350,000 cu. ft. per hr. maximum daily rate mixed gas.
95,000 cu. ft. per hr. maximum daily rate manufactured gas.
18 lbs. natural gas intake pressure.
3.5 lbs. discharge pressure mixed gas.
5 inches water manufactured gas intake pressure.

AT RIGHT

View of the "power mixer" installation of Syracuse Lighting Corp., which utilizes natural gas energy for compressing and mixing manufactured gas with natural.



DOMESTIC SALES

Natural Gas Market Facts on Refrigerators

● **B. H. GARDNER, director of sales, Columbia Engineering Corp., Columbus, Ohio; addressing Eastern Natural Gas Regional Sales Conference, A. G. A.—(Abstract):**

NATURAL gas companies in general have been laggard in pushing gas refrigeration. Possible reasons: Unit consumption has appeared small; poor water conditions in many natural gas territories retarded sale of early water-cooled units and intensified maintenance costs.

B. H. Gardner

Natural gas companies must now take stock of their attitude towards gas refrigeration, giving due weight to these facts:

Performance records on the new air-cooled box indicate that it will operate with about as little service expense as the standard gas range.

From a sales standpoint the new refrigerator is a decided asset, its good mark-up and low sales cost making it an item which can be sold "in the black," unlike such items as househeating equipment which are sold on small margins and involve considerable sales expense.

On refrigeration, original cost will take care of maintenance expense for several years, after which customers will not object to paying for any extraordinary maintenance.

Even though the gas refrigerator added no new load gas companies should push its sale, because it stamps gas service as a modern agency; the cooking load is safe in any home which has a gas refrigerator.

An often-overlooked advantage of the gas refrigerator: The customer may well place a value on its service far in excess of what that service actually costs. This was also the case when electric washers were first introduced, few high bill complaints being registered from homes with washers. The customer knew the grief attached to "tub and washboard" methods, reasoned that a machine freeing her from this drudgery must use considerable electricity—and was worth whatever it used.

Customers with gas refrigerators are more readily sold other gas services, through their acquaintance with gas efficiency and economy in their refrigerator.

Not to be ignored is the natural gas industry's social duty to promote gas refrigeration, as the most efficient and economical method available. There is little economic justification for an electric refrigerator in natural gas teritory.

Lastly, the refrigerator fits perfectly into the natural gas load-building and revenue scheme. Its load factor characteristics are almost perfect; summer load is greater than winter load.

Companies which have passed up the refrigerator as being insignificant from a gas consumption standpoint would be greatly concerned if any great portion of their cooking load were endangered. Yet the potential refrigeration load which may be reached in a reasonable period of years may well be equivalent to a large portion of the present cooking load. One large natural gas company estimates that its residential customers average 15,000 cubic feet per year for cooking, and 12,000 cubic feet for refrigeration—80 per cent of the cooking consumption per customer. This increased load should be available from perhaps as high as 50 per cent of residential customers in time. There is now a 24 per cent national saturation for electric refrigerators, which are subject to gradual replacement. The years ahead will see a much higher percentage of domestic refrigerator saturation than in the past, as proved by the fact that 1933 sales exceeded those of the boom year 1929 or any other year prior to 1933. Lower operating costs will give gas refrigeration a preferred sale. A potential of new load equivalent to 80 per cent of the cooking load for 50 per cent of a company's residential customers should stir the enthusiasm of any company management.

How Pittsburgh Reversed the Space Heater Trend

● **JOSEPH McKINLEY, vice-president in charge of sales, Equitable Gas Co., Pittsburgh, Pa.; addressing Mid-West Regional Gas Sales Conference, A. G. A.; topic "Space Heating — A Neglected Load Builder"—(Abstract):**

EQUITABLE Gas Co., serving natural gas to 165,000 customers in the Pittsburgh district, last year sold space heaters to approximately 5 per cent of its patrons—7,384 units in all.

These factors showed the need for preserving the Pittsburgh space heater heating load: First, the drop in heater sales from 50,000 in the early 1920's to 5,000 in 1932. Second, non-use of nearly 25 per cent of space heaters on the company's system, due in part to unsatisfactory operation of outmoded types.

The Pittsburgh area is definitely "soft coal minded"; about 50 per cent of domestic establishments have central heating plants, of which not more than 5 per cent burn gas, though low cost natural gas has been available in Pittsburgh for a lifetime. Equitable Gas Co. has an average of three space heaters per customer, and revenues from this load average about $6 per year per customer.

Considering the high saturation of space heating appliances on the company's system, and the low first-cost of units as compared with other types of load-building appliances, the company saw the wisdom of making a concentrated effort to stem the receding tide of heating sales. Two sales efforts were made during the year, one in the Spring and one in the Fall, each a month campaign. The first was a part of a general gas sales drive carried on throughout most of 1933 with the assistance of all employees.

As to campaign procedure, employee cooperation was attained in high degree by use of traditional methods. A low priced 10-radiant heater was offered for sale. Since the article could not be shown in door-to-door canvass work, large poster sheets featuring the heater were prepared for employee use. Meter readers delivered direct-by-mail pieces directly to the customer. Full sales data and an almost complete sales talk were supplied the entire employee personnel.

To indicate extent of employee interest 1155 heaters out of the 3168 sold in the first March campaign were bought by employees of affiliated companies, which had much to do with creating enthusiasm for general employee sales work during the balance of the year on other types of gas equipment.

The second campaign was a three-company effort participated in by gas utilities serving the Pittsburgh area, supported by joint advertising. The cam-

paign was conducted through a committee representing the three companies and promotional material was designed to apply generally. The inter-company campaign produced sale of 15,000 heaters in four weeks' time. Credit for the outstanding success of the Pittsburgh effort on space heating for 1933 is given to thorough preparation of sales plans, both the sales groups and the non-selling employees being impressed with the vital importance of the effort from the standpoint of securing new load and stabilizing old load.

All possible facilities for dealer cooperation were provided, though the measure of participation was somewhat disappointing.

The Pittsburgh companies accept the promotion of space heating as a utility responsibility, recognizing its value as a load builder and as a means of sustaining company position in competition with solid fuels.

How one of the Gas Service Co. properties is promoting modern gas ranges.

titled "The New Kitchen Technique" to cooperative dealers, architects, builders, contractors, etc. Through this means the latest in gas-designed equipment will be kept before those having to do with new construction or remodeling residences.

Educational work of the above nature is important but it only spreads preliminary knowledge which makes the salesman's path of approach easier. There must be adequate manpower in new business departments.

The Gas Service Co. sales plan for 1934 calls for reinstating the domestic incinerator in the sales picture. Several years ago the company conducted a three-year activity on incinerators, selling 1,200 to its 29,999 central heating customers. It is felt that the time is propitious for again stressing gas incinerators to central gas heating customers, for burning household waste formerly disposed of in the solid fuel furnace.

New Tactics to Protect The Kitchen Load

● **F. M. ROSENKRANS, new business manager, The Gas Service Co., Kansas City, Mo.; addressing Mid-West Regional Gas Sales Conference, A.G.A.; topic "Kitchen Modernizing for Greater Sales."—(Abstract):**

NOW is the time to lay the course of future new business promotion. The rising tide of general business opens up a large potential market, due to general postponement of buying during the past several years. By the same token, unless gas new business departments are prepared to replace obsolete equipment they are unusually vulnerable to competition at this time.

F. M. Rosenkrans

Recognizing the cooking load to be basic, it is interesting to analyze the rate at which sales should proceed to hold this field for gas. Using 15 years as the average life of a gas range the gas company with its associated dealers should sell at least 6⅔ per cent of its customers new ranges each year.

Consumers with antiquated cooking equipment have no conception of the service available through modern gas ranges. It is the gas company's job to carry on educational work for the new range.

In The Gas Service Co. group of properties the 1934 promotional plan provides for educational work to domestic customers in greater degree than ever before. First, aggressive newspaper advertising in large space is featuring illustrations of modern ranges, showing clock control and explaining its functions. The message is driven home that automatic gas ranges are most modern, as well as fastest and cheapest to operate.

Second, a new approach in home demonstration work is a part of The Gas Service Co. educational program. Home demonstrations adapted from the type carried on in vacuum cleaner and other home commodity selling are being used for the first time by the company's home service department. Arrangements are made with women who are entertaining groups in their own homes, to connect full automatic gas ranges in place of the old ranges. The home service demonstrator prepares the luncheon or tea, with the privilege of showing operation of the range to those present. No attempt is made to sell, the demonstration being strictly educational in nature. This method was placed in use on one of the company's larger properties the first of the year, and every day of the week has been booked for a home demonstration to date. This reaches a group of women who might never have been contacted properly through newspaper advertising or attending large cooking schools. The ranges are set in the homes the day before the meeting and removed the day following. Many direct sales have been traced to this activity.

As a third step in the educational program the company is distributing the American Gas Association booklets en-

Cooking Competition as the Manufacturer Sees It

● **I. W. PEFFLY, American Stove Co., Cleveland, Ohio; addressing Mid-West Regional Gas Sales Conference.—(Abstract):**

COMPETITION of electricity for the cooking load is not new; it has been with us for 20 years in some form or another, making little progress until recent time. Not so long ago it was generally accepted that gas had reached 100 per cent customer acceptance and that hence no special advertising or selling effort was necessary to add cooking load where gas is available. This attitude paved the way for the entrance of electricity. Gas men must now admit that furnishing gas for cooking is on a competitive basis. They must meet their competition as do other organized businesses, educating the public to the value of their product for cooking.

Definite superiority of gas in this field admits of no question; A.G.A. Laboratory Bulletin No. 4, issued in 1932, competitive tests made by gas range manufacturers, and numerous neutral laboratories such as that of Purdue University, have made available exact facts for refuting the misstatements as to electricity's superiority for cooking.

The time to actively combat electric competition is now, before service cancellations start pouring in. Among the guiding policies of gas companies actively promoting gas for cooking should be these:

1. Show and sell only fully equipped gas stoves.
2. Train salesmen to "trade up" the customer.
3. Plan year-around sales activities.
4. Concentrate on one or two makes.
5. Advertise gas advantages.
6. Glorify gas ranges through better floor and window displays.

Dissatisfied users of antiquated ranges are easy prey for electric advertising, and also for manufacturers of "gadgets" offered as gas savers.

By A.G.A. statistics the average cost per gas range is $40, and average range life is 12 years. Consumption averages a little more than $2 per month. This means a gross income to the gas company of more than $300 over the life of the range—which represents a "ratio of responsibility" of 8 to 1.

The most effective form of advertising is the word-of-mouth variety, which is available to the gas company at no additional expense. Present sales crews and non-sales employees should be equipped to tell the modern gas range story. The industry has every tool at its disposal for holding the basic cooking load—in superior equipment, economy of operation, present general customer acceptance. It becomes a matter of local company responsibility to work out its own program for using these tools. Such local programs the country over will result in an irresistible national movement sustaining gas as the national fuel for cooking.

1934 Home Service List Shows 370 Departments

Current listings of the A.G.A. Home Service Department has been prepared by the American Gas Association, for which Jessie McQueen is home service counsellor. The list totals 370 departments for 1934 compared with 316 for 1933. The number of directors in the departments, with their assistants, total 725 against 643 last year. Excepting Colorado, Idaho, Kansas, Nevada, Utah, Wyoming, the list shows home service departments in every state in the Union. Also represented are Canada, Australia, Cuba, Porto Rico, New Zealand and South America.

Gas Appliances Institute Opens Washington Office

The Gas Appliances Institute now has a Washington, D. C. office located at 510 Albee Bldg., with G. W. Bean as representative. According to announcement of C. W. Berghorn, secretary-treasurer of the organization, facilities are available for Washington meetings of the Institute and manufacturer members are invited to make it their headquarters when in Washington. Members of the gas appliance industry may address the Washington office concerning matters they desire to have taken up directly with the capital authorities.

INDUSTRIAL

Industrial Sales Lessons From the Depression

● **KARL EMMERLING, Industrial Fuel Engineer, The East Ohio Gas Co., Cleveland, Ohio; addressing Eastern Natural Gas Regional Sales Conference, A.G.A.; topic "Holding and Developing the Industrial Load."—(Abstract):**

WITH industrial gas sales on the uptrend it is timely to review the past three years of selling under adverse conditions. What lessons has the depression impressed upon industrial sales departments?

Natural gas has held a favorable percentage of its industrial load against competing fuels selling at record low prices, largely through rendering a continuous and complete service to its industrials. This service has taken several distinct forms such as engineering assistance toward reduction of heating costs; re-designing furnace and burner equipment for improved utilization; furnishing gas under special conditions—for example, at pressures permitting use of high-pressure burners without installing gas compressors. This sort of expert service from industrial staffs has helped to offset lower prices of competing fuels, for customers are reluctant to leave a gas line when it means working out their own problems of utilization without adequate assistance.

All companies have lost some industrial load. There is a lesson to be learned by analyzing the type of business which dropped out most readily. In the greater number of instances it will be found that customers lost to competing fuels were those having furnaces which could be easily converted. This results from the easy selling methods of past years which involved merely substituting gas burners for oil burners without re-designing furnaces. It is far better in the long run to take the extra time and spend the extra money to properly re-design furnaces for correct gas firing.

More care in instructing furnace operators in efficient natural gas use has been helpful in holding loads. Some companies have found it profitable to redouble their inspection and maintenance services. When natural gas cannot compete on a B.t.u. cost basis these additional services must make up the difference to the customer.

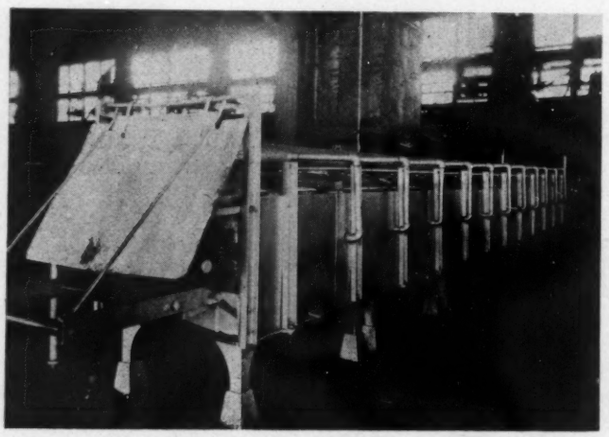
During depression years industrial plants operated under adverse conditions such as non-continuous firing periods, and many of these conditions have been more favorable to natural gas than to cruder fuels. Also there has been necessity for lower production costs, often secured through natural gas. These conditions in some cases have been translated into new gas load by alert industrial sales staffs.

Past years have demonstrated as never before the need for close knowledge of industrial processes, and of friendly relations with industrial customers. Industrial salesmen have had to be not only salesmen but good gas men, convincingly justifying industrial rates by explaining cost elements which enter into natural gas service.

The immediate future should see industrial operators replacing worn-out or inadequate equipment, and increasing plant capacities. The experience of depression years should enable the natural gas engineer to get a large share of this new business.

Trial Run of Memphis Plant

The Memphis (Tenn.) Power & Light Co. completed test runs on its recently added standby installations early in February, under the direction of Wm. A. Dunkley, superintendent of the gas department. Two 11-inch sets have been equipped with the Refractory Screen Oil Gas Process.



TYPICAL FURNACE on The East Ohio Gas Company lines, redesigned for correct gas firing. Furnace was originally fired with oil burners and had several combustion chambers on each side, below and to the side of the hearth. These chambers were torn out, the arch lowered, and burner nozzles installed under the arch on both sides of the furnace.

Pacific Coast Gas Association

Managing Director: Clifford Johnstone
Association Headquarters:
447 Sutter Street, San Francisco

President: George P. Egleston
General Manager, H. R. Basford Co.,
San Francisco

1934 Convention Dates Set September 11-13

PRESIDENT Geo. P. Egleston has announced that the 1934 Convention of the Pacific Coast Gas Association will take place at Hotel Del Monte, September 11, 12 and 13. Del Monte is an ideal convention spot. Its beautiful surroundings, its freedom from outside distractions, and the solicitude of its management for the comfort of guests combine to make it a favorite location for business meetings of Pacific Coast organizations.

The 1934 Convention will be strictly a business meeting. Never before in its history has the gas industry had so many pressing problems. Competitive problems, Code problems, financial problems, and problems imposed by the "New Deal" which threaten the very existence of our means of livelihood affect all of us and require united action in their solution. The 1934 Convention will be devoted to stocktaking and planning for the future.

T. J. Strickler Endorsed For National Chamber

Both the American Gas Association and the Pacific Coast Gas Association have endorsed the candidacy of Major Thomas J. Strickler for nomination as a director of the Chamber of Commerce of the United States to represent the Seventh Election District.

Major Strickler is vice-president and general manager of the Kansas City Gas Co. and will be remembered by members of the Pacific Coast Gas Association as being one of the principal speakers on the program of our Thirty-ninth Convention held in Del Monte in 1932.

Major Strickler has been most active in Kansas City civic affairs and has the unqualified support of the Chamber of Commerce of Kansas City and many other organizations.

Evans Manager at Capistrano

G. P. Evans was recently made permanent district manager of the San Diego (Calif.) Consolidated Gas & Electric Co.'s San Juan Capistrano office.

F. A. Hough

Pierre Vinet

Douglas Buckler

Technical, Sales and Advertising Conferences

Frederic A. Hough, Pierre Vinet, and Douglas Buckler, leaders respectively of the Technical, Commercial, and Advertising Sections of the Association, are rapidly completing plans and programs for conferences to be held in Los Angeles this month.

The Technical Conference will take place on March 22 and 23, and the program as tentatively arranged is published in this issue. The Commercial and Advertising Sections will hold a joint conference on March 29 and 30. Complete programs for each of the March conferences will be mailed to all Association members prior to the meetings.

Tentative Program March Technical Conference

THE annual March Conference of the Technical Section is usually one of the best technical meetings of the Association's calendar. More time is available for discussion and there are fewer competing attractions than at the Annual Convention.

This year, as the tentative program given below shows, much of the committee work has progressed to the point where partial or final reports can be made. In cases where this is not so, progress reports will be presented.

The technical Section is now divided into four major committees, as follows: Production; Transmission; Distribution; Utilization.

All of these committees, with the exception of the Production Committee, are contributing to the program of the March meeting. The Production Committee's program will be presented at the Northwest Conference.

Sessions of the March Technical Section Conference will be held at the Los Angeles Gas and Electric Corp. Building, 810 South Flower St., Los Angeles, the tentative program being as follows:

THURSDAY, MARCH 22, 9:30 A.M.

UTILIZATION COMMITTEE

Frank Wills, Pacific Gas and Electric Co., Chairman.

1. Paper—The solution of pilot light problems encountered in San Diego during the change-over to natural gas. C. W. Whaling, San Diego Consolidated Gas & Electric Co.
2. Paper—An analysis of a recent survey of the frequency and cause of service calls concerning pilot lights. J. C. Gilbert, Southern Counties Gas Co.
3. Paper—Pilot light troubles resulting from the distribution of natural gas containing hydrogen sulphide. J. C. Gilbert, Southern Counties Gas Co.
4. Paper—The resistance to dust stoppage of various types of pilot orifices. Guy Corfield, Los Angeles Gas and Electric Corp.
5. Paper—The frequency with which consumers call for service. A study of 10,000 cases. R. V. Davis, Los Angeles Gas and Electric Corp.
6. Paper—A study of large capacity hot water systems for apartment houses. L. O. Howell, Los Angeles Gas and Electric Corp.

THURSDAY—1:30 P.M.

NATURAL GAS TRANSMISSION COMMITTEE

P. E. Beckman, Pacific Gas and Electric Co., Chairman.

1. Sub-committee on Soil Corrosion. W. R. Schneider, Chairman.
   (a) Paper—Effect of cathodic protection on bituminous coatings A. B. Allyne, Southern Counties Gas Co.
   (b) Paper—Pilot grounds for cathodic protection. W. R. Schneider, Pacific Gas and Electric Co.
   (c) Paper—Electrolysis testing of wrapped pipe. Mr. T. C. Fronmuller, Pacific Gas and Electric Co.
   (d) Paper—Effect of soil moisture on soil stress. Guy Corfield, Los Angeles Gas and Electric Corp.
2. Sub-committee on Compressor Stations. A. B. Newby, Southern California Gas Co., Chairman.
   (a) Paper—Calibration of mixing valves to secure a uniform setting. D. H. Toler, Industrial Fuel Supply Co.
   (b) Paper—Life of piston rings on single acting gas engines. T. C. Wallace, Southern Counties Gas Co.
3. Sub-committee on Large Volume Gas Measurement. R. M. Stewart, Pacific Gas and Electric Co., Chairman.
   (a) Paper—Sound proofing of meter and regulator stations. M. J. Cereghino, Los Angeles Gas and Electric Corp.
4. Sub-committee on Internal Corrosion. A. B. Allyne, Southern Counties Gas Co., Chairman.
   (a) Progress report on dehydration of natural gas. A. B. Allyne, Southern Counties Gas Co.
   (b) Progress report on design and testing of water and dust separators. B. M. Laulhere, Southern California Gas Co.
   (c) Paper—Purification of Venice Field natural gas containing hydrogen sulphide. A. B. Allyne, Southern Counties Gas Co.

FRIDAY, MARCH 23, 9:30 A.M.

DISTRIBUTION COMMITTEE

A. R. Bailey, Coast Counties Gas and Electric Co., Chairman.

1. Sub-committee on effect of humidity on meter diaphragms. H. M. Crawford, Los Angeles Gas and Electric Corp., Chairman.
   (a) Progress report.
2. Sub-committee on maintenance of curb meters. Fred Winslow, Southern Counties Gas Co., Chairman.
   (a) Progress report.
3. Sub-committee on effect of prover-room temperatures on meter proofs. W. A. Bahr, Pacific Gas and Electric Co., Chairman.
   (a) Progress report on committee's work.
   (b) Progress report on tests now being conducted by Southern California Gas Co. D. R. Hiskey.
4. Sub-committee on distribution pressure control. Elting Henderson, Southern California Gas Co., Chairman.
   (a) Progress report.
5. Sub-committee on service connections for cast iron mains. H. S. Harris, Los Angeles Gas and Electric Corp., Chairman.
   (a) Progress report.

FELLOWSHIP LUNCHEON—Friday, 12:30 P.M. 12th Floor, Los Angeles Gas and Electric Corp. Building.

FRIDAY—2:00 P.M.

6. Sub-committee on procedure for major interruptions to gas service. William M. Henderson, Los Angeles Gas and Electric Corp., Chairman.
   (a) Progress report.
   (b) Paper—Earthquakes as a cause of major interruptions to gas service. N. L. Hoff, Los Angeles Gas and Electric Corp.
   (c) Discussion of above paper by Dr. Harry O. Wood, Director Seismological Laboratory, Carnegie Institute of Washington.
7. Paper—Stopping a slipping mountain side with the aid of natural gas. Raymond Hill, of Quinton, Code, Hill, Leeds and Barnard, Consulting Engineers.
8. Paper—Application of X-rays to certain gas engineering problems. R. J. Love, Southwest Welding and Mfg. Co.
9. Paper—Solving the safety problem with humor. H. S. Harris, Los Angeles Gas and Electric Corp.
10. Paper—A self-contained gasoline-motor driven jack hammer for use in gas distribution work. W. M. Henderson, Los Angeles Gas and Electric Corp.

Personnel of Technical Sub-Committees

F. A. HOUGH, general chairman of the Technical Section, has released the membership of sub-committees of the Distribution and Transmission Committees.

DISTRIBUTION COMMITTEE

A. R. Bailey, Chairman, Coast Counties Gas & Electric Co.

Cast Iron Pipe Service Connections

H. S. Harris, Chairman, Los Angeles Gas and Electric Corp.
Claude Brown, American Cast Iron Pipe Co.
Lee Chamberlain, U. S. Pipe and Foundry Co.
V. Doyle, Pacific States Cast Iron Pipe Co.
A. E. Englebright, Pacific Gas and Electric Co.
W. E. Gentner, Southern Counties Gas Co.
B. M. Laulhere, Southern California Gas Co.
F. P. Minton, Los Angeles Gas and Electric Corp.
D. H. Perkins, San Diego Consolidated Gas and Electric Co.
V. M. Wall, Clow-National Cast Iron Pipe Co.

Curb Meter Installations

F. H. Winslow, Chairman, Southern Counties Gas Co.
O. F. Anderson, Coast Counties Gas and Electric Co.
F. A. Arnesen, Pittsburgh Equitable Meter Co.
B. A. Devine, Southern Counties Gas Co.
R. W. Gregory, Southern Counties Gas Co.
E. H. Roseberry, Sprague Meter Co.
C. B. Samuelson, Pacific Gas and Electric Co.
K. C. Tomlinson, Pacific Meter Works.

Distribution Pressure Control

Elting Henderson, Chairman, Southern California Gas Co.
A. E. Englebright, Pacific Gas and Electric Co.
N. L. Hoff, Los Angeles Gas and Electric Corp.
H. J. Keeling, Southern Counties Gas Co.
D. C. Murphy, Southern California Gas Co.
V. J. Robbins, Los Angeles Gas and Electric Corp.
Otto Goldkamp, San Diego Consolidated Gas and Electric Co.

Effect of Humidity on Meter Performance

H. M. Crawford, Chairman, Los Angeles Gas and Electric Corp.
Guy Corfield, Los Angeles Gas and Electric Corp.

Procedure for Major Interruptions

W. M. Henderson, Chairman, Los Angeles Gas and Electric Corp.
A. F. Bridge, Southern Counties Gas Co.
Van E. Britton, Pacific Gas and Electric Co.
E. S. Bryant, City of Long Beach.
H. S. Harris, Los Angeles Gas and Electric Corp.
N. L. Hoff, Los Angeles Gas and Electric Corp.
F. S. Honberger, Southern California Gas Co.
T. N. Kellett, Los Angeles Gas and Electric Corp.
J. J. McCrory, Los Angeles Gas and Electric Corp.
D. H. Perkins, San Diego Consolidated Gas and Electric Co.
V. J. Robbins, Los Angeles Gas and Electric Corp.

Prover Room Temperatures

W. A. Bahr, Chairman, Pacific Gas and Electric Co.
H. M. Crawford, Los Angeles Gas and Electric Corp.
J. P. Jenkins, Pacific Gas and Electric Co.
Geo. McKay, Pacific Gas and Electric Co.
F. H. Winslow, Southern Counties Gas Co.
L. Wollenberger, Coast Counties Gas and Electric Co.

TRANSMISSION COMMITTEE

P. E. Beckman, Chairman, Pacific Gas and Electric Co.

Compressor Stations

A. B. Newby, Chairman, Southern Counties Gas Co.
Leal Davis, Pacific Gas and Electric Co.
S. S. Donaldson, Southern California Gas Co.
Grove Lawrence, Southern California Gas Co.
D. H. Toler, Industrial Fuel Supply Co.

Dehydration of Natural Gas

A. B. Allyne, Chairman, Southern Counties Gas Co.
Malcolm Burton, Southern California Gas Co.
Guy Corfield, Los Angeles Gas and Electric Corp.
Mark Hardie, Montana Power Co.
B. M. Laulhere, Southern California Gas Co.
C. S. Pool, Industrial Fuel Supply Co.
G. B. Reece, Southern Counties Gas Co.
M. A. Richford, Pacific Gas and Electric Co.
F. E. Wilson, Pacific Gas and Electric Co.

Measurement

R. M. Stewart, Chairman, Pacific Gas and Electric Co.
W. A. LaViolette, Pacific Gas and Electric Co.
L. F. Reetz, Pacific Gas and Electric Co.
C. A. Renz, Los Angeles Gas and Electric Corp.
B. G. Williams, Southern California Gas Co.
L. Wollenberger, Coast Counties Gas and Electric Co.

Pipe Protection

Wm. R. Schneider, Chairman, Pacific Gas and Electric Co.
A. B. Allyne, Southern Counties Gas Co.
C. M. Buck, Pacific Gas and Electric Co.
R. V. Buffington, Los Angeles Gas and Electric Corp.

Guy Corfield, Los Angeles Gas and Electric Corp.
C. P. de Jonge, San Diego Consolidated Gas and Electric Co.
T. C. Fronmuller, Pacific Gas and Electric Co.
Chris Goldkamp, San Diego Consolidated Gas and Electric Co.
D. R. Hickey, Southern California Gas Co.
A. J. Keeling, Southern Counties Gas Co.
B. A. Williams, Los Angeles Gas and Electric Corp.
O. L. Wrestler, Los Angeles Gas and Electric Corp.

Publications Received

Soft Metal Melting. Industrial Service Letter No. 17 of American Gas Association.

Solubility and Liberation of Gas From Natural Oil-Gas Solutions, by Ben F. Lindsly. Technical Paper No. 554, U. S. Bureau of Mines.

Carbon Black, by G. R. Hopkins and H. Backus. From Minerals Year Book, U. S. Bureau of Mines. Statistics of Production and Sales, 1932.

Fire Hazards of Domestic Heating Installations, by G. Q. Voigt. Research Paper R. P. 596, U. S. Bureau of Standards. (Includes results of fire hazard test on gas range with uninsulated oven.)

Research in Fundamentals of Combustion Space Requirements in High Temperature Gas Furnaces. Committee on Industrial Gas Research, American Gas Association. Report No. 723.

Injunction Granted by District Court in P. G. and E. Case

AN interlocutory injunction restraining the California Railroad Commission from enforcing its November 13 order reducing natural gas rates of the Pacific Gas and Electric Co. was granted on February 5 by U. S. district court decision. The case will now be tried de novo, Judge H. M. Wright having been appointed master to take testimony, which will begin March 19.

In the opinion and order granting the injunction it is pointed out that the California Commission in a recent decision had allowed a 7 per cent return on fair value of the property in question, equal to 7.7 per cent upon historical cost, but that in the P. G. and E. case only 6⅔ per cent return upon historical cost had been allowed.

Failure of the Commission to give proper weight to reproduction costs and its exclusion of any allowance for going concern value in the rate base were also commented upon in the opinion as grounds for granting the injunction.

All-Gas Kitchen at Phoenix Better Homes Show

The Central Arizona Light and Power Co., Phoenix, Ariz., had a model natural gas kitchen as part of its exhibit in the recent Better Homes Show of the Arizona Republic and Phoenix Gazette. In addition to the all-gas kitchen, water heaters, gas stoves, heaters, ranges, etc., were on display.

GAS COMPANY OPERATIONS FOR THE STATES OF CALIFORNIA, ARIZONA, NEVADA, OREGON AND WASHINGTON AND THE PROVINCE OF BRITISH COLUMBIA

Calendar Year 1932 Compared with 1933

A STATISTICAL summary of gas operations in Pacific Coast territory for the year 1933 as compared with 1932 has been prepared by the Pacific Coast Gas Association. It will be noted that nearly all of the totals show increases, though domestic revenues and cubic foot sales were fractionally less than 1932. Commercial and industrial sales were 20 per cent ahead.

Comparison of the summary below with the 9-month summary published in *Western Gas* for December shows that fourth-quarter gains were considerable ones, in spite of warm winter temperatures prevailing throughout the coast area.

Detailed figures for the various states of the Association area are available at P.C.G.A. headquarters.

	1932	1933	Per Cent Change
Production—M c. f.			
Water Gas	2,907,490	2,331,655	
Coal Gas	1,516,614	649,889	
Oil Gas	7,017,779	4,415,964	
Coke Oven Gas	670,870	1,696,617	
Butane Gas—550 B.t.u.	252,531	229,172	
Natural Gas Purchased	135,086,528	151,923,308	
TOTAL	147,451,812	161,246,605	+9.3%
Active Meters—Dec. 31			
Domestic	1,531,410	1,539,420	+0.5%
Commercial and Industrial	72,000	74,350	+3.3%
TOTAL	1,603,410	1,613,770	+0.6%
Sales—M c. f.			
Domestic	60,702,111	60,205,916	—0.8%
Commercial and Industrial	49,157,150	58,973,687	+20.0%
Electric Generation	14,794,171	16,394,428	+10.8%
TOTAL	124,653,432	135,574,031	+8.8%
Gross Revenue			
Domestic	57,387,278	56,703,551	—1.2%
Commercial and Industrial	14,214,377	15,445,767	+8.7%
Electric Generation	1,907,923	1,948,344	+2.1%
TOTAL	73,509,578	74,097,662	+0.8%
Miles of Main—Dec. 31	25,982	26,309	
Number of Employees—Dec. 31	11,432	11,225	
Annual Payroll	$18,881,918	$16,949,391	

Special Schedule for House Heating at Portland

PORTLAND (Ore.) Gas & Coke Co., which serves oil gas of 570 B.t.u., has two new rate schedules in force, incorporating marked reductions for house heating. One applies to "combination" customers using gas in residences, apartments and flats where gas is the exclusive fuel for cooking and/or waterheating, and for the major house heating requirements.

Under this combination rate customers served through meters of less than Light B capacity pay 75 cents for the initial 300 cubic feet or less, following which this schedule applies per M c.f.:

Next 3,700 cubic feet	$1.095
Next 4,000 cubic feet	.765
Next 7,000 cubic feet	.40
Next 40,000 cubic feet	.35
Excess	.25

The above block rate applies throughout the schedule but initial charges for the first 300 cubic feet or less vary for service rendered to various size meters. These initial charges are virtually the same as those used in the company's special house heating schedule, described below, though the amount of gas paid for by the initial charge is not the same in all respects under the two rates.

The minimum monthly charge under the combination schedule is $3.

The above schedule took effect on January 1, 1934. Last November the Portland company introduced a schedule applying only to house heating and gas engines, and to gas refrigeration where gas is the exclusive fuel for major house heating requirements. For the first 10,000 cubic feet this schedule is as follows:

Less than 10 Light B Meter:
First 300 Cu. Ft. or less per month.....$0.75
Next 2,400 Cu. Ft. at $0.765 per M. C. F.
Next 7,300 Cu. Ft. at $0.40 per M. C. F.

10 Light B or 20 Light Meter:
First 300 Cu. Ft. or less per month.....$.90
Next 2,000 Cu. Ft. at $0.765 per M. C. F.
Next 7,700 Cu. Ft. at $0.40 per M. C. F.

30 Light Meter:
First 300 Cu. Ft. or less per month.....$1.15
Next 1,300 Cu. Ft. at $0.765 per M. C. F.
Next 8,400 Cu. Ft. at $0.40 per M. C. F.

20 Light B Meter:
First 300 Cu. Ft. or less per month.....$1.30
Next 900 Cu. Ft. at $0.765 per M. C. F.
Next 8,800 Cu. Ft. at $0.40 per M. C. F.

45 Light Meter:
First 300 Cu. Ft. or less per month.....$1.40
Next 600 Cu. Ft. at $0.765 per M. C. F.
Next 9,100 Cu. Ft. at $0.40 per M. C. F.

60 Light or 30 Light B Meter:
First 300 Cu. Ft. or less per month.....$1.62
Next 9,700 Cu. Ft. at $0.40 per M. C. F.

100 Light or 60 Light B Meter:
First 1,500 Cu. Ft. or less per month.....$2.10
Next 8,500 Cu. Ft. at $0.40 per M. C. F.
200 Light, 100 Light B or No. 5 Sprague Meter:
First 5,000 Cu. Ft. or less per month.....$3.50
Next 5,000 Cu. Ft. at $0.40 per M. C. F.
300 Light Meter:
First 8,750 Cu. Ft. or less per month.....$5.00
Next 1,250 Cu. Ft. at $0.40 per M. C. F.

The next 40,000 cubic feet bears a 35 cent charge per M c.f., and excess is 25 cents per M c.f.

Under this schedule the initial charge for the first block of gas used for house heating service is waived during the months of July and August, and consumption in this period is billed at the rate of 76½ cents per M c.f.

Under the house heating schedule a 4.5 per cent saving over former rates is shown for consumption of 3,000 feet; 27.6 per cent for 20,000 feet; 31.4 per cent for 30,000 feet; 33.6 per cent for 50,000 feet; 44.5 per cent for 100,000 feet; and rapidly mounting savings for consumption in excess of the above.

Distribution Conference at Detroit April 9-10

HIGHLIGHTING the year for gas distribution men, the American Gas Association's Annual Distribution Conference will convene at the Book-Cadillac Hotel, Detroit, Mich., on April 9 for a two-day meeting. H. W. Battin, United Gas Improvement Co., Philadelphia, Pa., as chairman of the Distribution Committee will preside over the sessions. Following is the tentative program, as released from A.G.A. headquarters.

APRIL 9

10:00 A. M.

Opening Remarks—H. W. Battin, Chairman, Distribution Committee.

Greetings—Alexander Forward, Managing Director, American Gas Association.

Welcome to Detroit—J. W. Batten, vice-president and general manager, Detroit City Gas Co., Detroit, Mich.

Paper: The Distribution Office—H. A. Anderson, Syracuse Lighting Co., Syracuse, N. Y.

Paper: Work on Consumers Premises—C. E. Muehlberg, Consolidated Gas Co. of New York, New York, N. Y.

2:00 P. M.

Paper: Maintaining Installations—R. H. Taylor, Public Service Co. of Colorado, Denver, Colo.

Address: What About the Gas Engineer—C. N. Chubb, American Light & Traction Co., Chicago, Ill.

Paper: Removing and Resetting Meters and Turn-On and Off Expense—H. L. Gaidry, New Orleans Public Service Inc., New Orleans, La.

Paper: Connecting Ranges, Water Heaters, Refrigerators and House Heaters—H. D. Lehman, Philadelphia Gas Works Co., Philadelphia, Pa.

Paper: Storeroom Operation and Its Inter-Related Activities in the Gas Industry—A. I. Snyder, Detroit City Gas Co., Detroit, Mich.

APRIL 10

9:30 A. M.

Paper: Organization and Operation of Numerous Distributing Systems Scattered Over Wide Areas—Chester L. May, Community Natural Gas Co., Dallas, Texas.

Paper: Satisfying the Customer — Hulda Ungericht, Ohio Fuel Gas Co., Columbus, Ohio.

Paper: Consolidation of Shops—H. B. Anderson, Philadelphia Gas Works Co., Philadelphia, Pa.

Open Forum.

2:00 P. M.

Report: Subcommittee on Meters and Metering—L. H. East, Chairman, Rochester Gas & Electric Corp., Rochester, N. Y.

Report: Subcommittee on Pipe Coatings and Corrosion—George H. Boyd, Chairman, Consolidated Gas Co. of New York, New York, N. Y.

Report: Corrosion Survey for Pipe Lines and Distribution Systems—Dr. Scott Ewing, Research Associate, U. S. Bureau of Standards, Washington, D. C.

Report: Subcommittee on Pipe Joints—C. H. Waring, Chairman, Kansas City Gas Co., Kansas City, Mo.

Paper: Corrosion of Bolts on Pipe Joints—J. A. Perry, The United Gas Improvement Co., Philadelphia, Pa.

Paper: The Distribution of Gasket Pressures in Pipe Joints and Clamps—George H. Pfefferle, S. R. Dresser Manufacturing Co., Bradford, Pa.

Report: Subcommittee on Cast Iron Pipe Standards—C. C. Simpson, Chairman, Consolidated Gas Co. of New York, New York, N. Y.

Closing Remarks: Tenth Anniversary of the Distribution Conference—Its Accomplishments—J. D. von Maur, Consumers Gas Co. of Toronto, Toronto, Ont., Canada.

Panhandle Gas Conservation Object of New Association

An organization known as the Panhandle Conservation Association has been formed with headquarters in the Amarillo Building, Amarillo, Texas. Composed of oil and gas operators, land and royalty owners, and citizens generally, the new organization will conduct a program of public education to the end that wastage of gas in the Texas Panhandle field may be eliminated at the earliest possible moment.

Officers of the Panhandle Conservation Association include Joe T. Sneed, Jr., as president; C. E. Weymouth, vice-president; and A. C. Smith, secretary.

Albertine Berry Home Service Director for Lone Star System

Albertine Berry, former home service director of the Dallas (Texas) Gas Co., was transferred in January to the public relations-advertising department of Lone Star and will act as home service director for the entire system.

Edith Snodgrass has been transferred from the Dallas Gas Co. also, to become auditorium hostess in the home service department of Lone Star.

B. C. Electric Goes on the Air

The B. C. Electric Railway Co., Vancouver, B. C., is on the air with a series of 15-minute home service department programs broadcast over Station CKWX, under the direction of Jean E. Mutch, director of the company's home service department.

1934 Calendar

March

Oklahoma Utilities Association—16th Annual Convention, Tulsa, Okla., March 6-7.

Southern Gas Association, Southern Regional Sales Conference (A.G.A.) and Southwestern Regional Sales Conference (A.G.A.) — Joint Meeting, Memphis, Tenn., March 21-23.

Pacific Coast Gas Association, Technical Section—Annual Spring Conference, Los Angeles, Calif., March 22-23.

Pacific Coast Gas Association, Commercial Section, and Publicity and Advertising Section—Joint Spring Conference, Los Angeles, Calif., March 29-30.

April

Mid-West Gas Association — Sioux City, Iowa, April 16-18.

Missouri Association of Public Utilities—Annual Convention, The Elms Hotel, Excelsior Springs, Mo., April 19-20.

Southwestern Gas Measurement Short Course—University of Oklahoma, Norman, Okla., April 24-26.

May

Natural Gasoline Association of America—Tulsa, Okla., May 9-11.

International Petroleum Exposition—Tulsa, Okla., May 12-19.

June

Canadian Gas Association—27th Annual Convention, Windsor Hotel, Montreal, Canada, June 4-5.

September

Pacific Coast Gas Association—41st Annual Convention, Hotel Del Monte, Del Monte, Calif., September 11-13.

October

American Gas Association — 16th Annual Convention, Atlantic City, N. J., Week of October 29.

Gas Service Sells Over Half Million Dollars Worth Appliances

More than $665,225 worth of gas appliances were sold by the new business departments of The Gas Service Co., Kansas City, Mo., during 1933. Ranges and cookers led the list of appliances, a total of 3,705 being sold during the year. Radiant type heaters came second with a total of 1,859; storage systems followed with a record of 1,347. Renovizing jobs amounting to 1005 aided in making the slightly more than one-half million dollars sales. There were a total of 925 large caparity space heaters sold; 469 gas designed burners; and 307 gas designed furnaces included in the sales.

A.P.I. Changes Address

Headquarters offices of the American Petroleum Institute were moved February 24 to Room 2040, 50 West 50th Street, New York, N. Y. The Institute formerly maintained offices at 250 Park Avenue.

COMMITTEE:
DOUGLAS BUCKLER...SO. CALIF. GAS CO.
J. EARL JONES.....SEATTLE GAS CO.
A. C. JOY (CHAIRMAN).....P. G. & E.
D. L. SCOTT.....L. A. G. & E. CO.
PIERRE VINET.....C. C. G. & E. CO.

1934
P·C·G·A·
ORGANIZED PACIFIC COAST GAS ASSOCIATION JULY 11TH 1895

HEADQUARTERS:
PACIFIC COAST GAS ASSOCIATION
447 SUTTER STREET, SAN FRANCISCO

GEO. P. EGLESTON, PRESIDENT
CLIFFORD JOHNSTONE, MNG. DIRECTOR

CO-OPERATIVE LOAD-BUILDING MONTHLY NEWS ···· AND VIEWS

RESTAURANT—Six hotel and restaurant magazines carry this tribute to gas, by the management of a leading Santa Monica (Calif.) cafe.

"GIANT"—The mighty Gas BTU, symbolic of savings, is dramatized in five trade publications by this heroic conception.

MILK—"Speed, cleanliness, economy" keep the People's Dairy, San Francisco, "sold" on gas, the modern fuel. (Pacific Dairy Review.)

PLUMBING—The plumbing business owes its survival to gas appliance merchandising, this contractor asserts. (Western Plumbing & Heating Journal.)

NEW ADS COMBINE DIGNITY AND POWER

Ultra-modern simplicity is the keynote of these striking advertisements, now appearing in 20 leading Pacific Coast trade and industrial magazines. (Typical samples from 1934 series, greatly reduced in size.)

DEALER—A Bakersfield (Calif.) furniture dealer is "Enthusiastic" over gas-appliance merchandising. (Western Furniture Retailing.)

CANDY—Largest candy bar manufacturer in the West standardizes on gas-fired equipment. (Western Confectioner & Ice Cream News.)

—Watch this page each month for additional "Load-builders".

BUTANE • PROPANE NEWS

Vol. 4, No. 3 March, 1934

Cold storage plant of Southeastern Service Corp. at Indio, Calif.

A Gas Company in the Cold Storage Business

BUTANE-PROPANE REFRIGERATION

By L. W. THURLOW

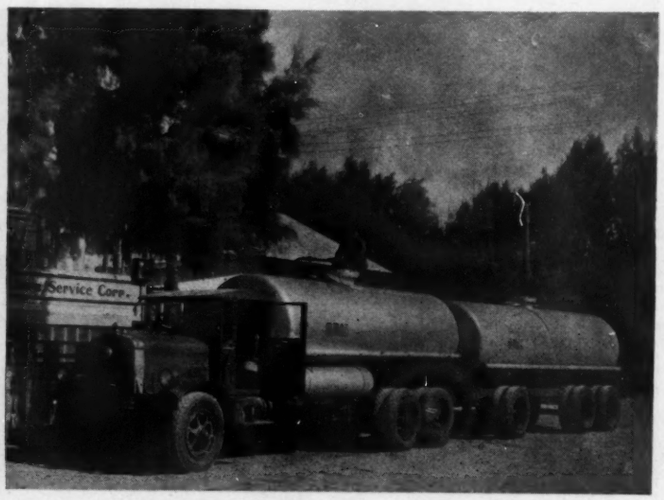
Chemical Engineer, Indio, Calif.
Manager, Southeastern Service Corp.

REFRIGERATION by mechanical means, or by heat as illustrated in thousands of homes by the Electrolux has long since become commonplace. However, refrigeration by the perpetual motion route, without recourse to machinery or heat, is news, and news of considerable importance. In the particular case herein described, mechanical means were indeed used to compress and assist in the liquifaction of the gases which in expanding made this refrigeration possible, but this work was done a good many miles from the cold storage plant in which the heat exchange took place. Furthermore, the gases produced, after releasing their heat, were again utilized in the regular business of the company, that of distributing gas through pipe lines to its many consumers.

The Southeastern Service Corp. owns and operates the liquid gas vaporization plant that provides the city of Indio, Calif., with natural gas, each cubic foot of which has a heat value of approximately 3,000 B.t.u. As is common with plants of this type a heat exchanger had to be used to dissipate the latent heat of evaporation of the liquid being vaporized. In this case this function was performed by a hot water heater through which was coiled some hundred-odd feet of 1-inch pipe. Approximately 1 per cent of the gas vaporized was utilized in keeping the water hot. Inasmuch as this represented a cash outlay of a good many dollars every month, and since each pound of liquid vaporized released 175 B.t.u. equivalent to 1.2 pounds of ice, which could have been utilized, a condition of economic waste existed.

Having sufficient refrigeration available to operate a small cold storage plant; with repeal of the 18th Amendment in the offing, and with no cold storage facilities in the town for storing barrel beer, the company decided to build the plant and make the experiment.

There is plenty of information available regarding ammonia and other commercial refrigeration systems, thousands of which are in daily operation. On the other hand, we had little information at hand regarding the expansion qualities of the liquid with which



LEFT: One of two 3300-gallon tanks installed in February at Indio, Calif., plant of Southeastern Service Corp. Second storage tank is seen on truck in background. RIGHT: Delivering butane-propane mixture by truck and trailer to Indio plant.

we were operating, namely a butane-propane mixture varying from 25-50 per cent butane, depending upon the season. Nor did we have any precedents upon which to fall back concerning coil arrangement. Everything had to be experimentally determined. Therefore, in order to facilitate pipe changes extra heavy fittings (threaded) and standard black iron pipe were used instead of welded joints. The storage room measured 22 feet long by 10½ feet wide by 9 feet high and contained approximately 2200 cubic feet of air space over an area of 248 square feet.

The first piping arrangement provided for two expansion valves, one at either end of the storage room, permitting the expansion of the gas into both ends at the same time. The 1¼-inch pipe, in 10-foot lengths, with 6-inch return bends, from one end, formed a zig-zag coil which joined a similar coil proceeding from the other end of the room, the joint outlet then passing through the wall of the storage to the regulator system, thence to the master meter and the city service lines. The expansion valves were of the Bastian-Blessing type with head pressures ranging from 60-90 pounds per square inch gauge, depending upon the temperature of the air. The pressure on the low side of the expansion valves were kept between 5 and 10 pounds to the square inch while the regulator system still further reduced this pressure to 10 inches of water which is the pressure maintained on the city mains.

Preliminary tests disclosed the fact that so short a line per expansion valve, 150 feet of 1¼-inch pipe, was inadequate to completely expand all of the liquid required to refrigerate the room, liquid gas passing out of the room and into the regulator system even to the master meter. In order to avoid the loss of any cooling one of the expansion valves was taken away and all liquid was allowed to expand through one valve and through the entire length of pipe used in the storage room, namely 300 feet. Under the new arrangement we were enabled to completely vaporize sufficient of the liquid to maintain our storage temperature without loss. Only on rare occasions does the liquid pass through the entire length of coil and extend to the regulator system.

Here in the Coachella Valley, below sea level, the summer heat not infrequently exceeds 125° F. While this is not unendurable, due to the high refrigeration value of skin moisture, yet in the cold storage business heat is heat, and the greater the differential between inside and outside temperatures the greater the radiation losses. Also, anything placed in storage at our Indio plant had to be cooled from a much higher temperature than usually obtains, and this was particularly true of the beer which was all hauled from Los Angeles, 137 miles away. Taking all of these things into consideration we built our walls 8 inches thick and well packed with dried wood shavings. The walls were further sealed, inside and out, with two-ply brownskin paper to prevent infiltration of warm air. The floor had a thickness over all of 12 inches and was similarly protected. The ceiling was also well insulated.

Within 36 hours after turning on the gas our room had dropped to a temperature well below the 40°F. considered necessary to hold beer, and with the outside temperature rang-

TWICE AS MANY IN SERVICE

Twice as many Hackney Liquefied Petroleum Gas Cylinders in service as all others combined. Or, put it another way—every time a Liquefied Petroleum Gas Cylinder is used—two to one it will be a Hackney cylinder.

Domination of this market has been won by the superior design and construction of Hackney Liquefied Petroleum Gas Cylinders—which were built by Hackney from the first development of these products.

PRESSED STEEL TANK COMPANY

208 S. La Salle St. Bldg., Room 1185, Chicago, Ill.
1363 Vanderbilt Concourse Bldg., New York, N. Y.
6633 Greenfield Ave., Milwaukee, Wis.
666 Roosevelt Bldg., Los Angeles, Calif.

Hackney MILWAUKEE

CONTAINERS FOR GASES, LIQUIDS AND SOLIDS

If you would keep in touch with the Natural Gas and Butane industries, send a check for $2.00 to

WESTERN GAS
810 South Spring Street, Los Angeles

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Company.....
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WM. B. SCAIFE & SONS CO.
OAKMONT, PENNA.
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BUTANE
Fuel of the Future

BUTANE is an efficient, economical substitute for manufactured gas, natural gas, and electricity for domestic and industrial uses, including heat-treating, cutting, welding, refrigerating. The perfect fuel for rail motor cars, busses, trucks, stationary engines.

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CO.

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ing from 110-115°F. dropped still further to 14° above zero before the limit was reached. This, it is understood, was done with an empty box and no refrigeration was necessary outside of that required to maintain radiation losses. Later, when we were handling from 25-50 barrels of beer daily, with temperatures averaging 120°F., and with frequent opening and closing of doors to permit ingress and egress of merchandise, we maintained 40° with some difficulty. The utmost care had to be taken, on account of decreased summer gas business, to hold the storage down to the required point. However, by careful attention to every detail we suffered no spoilage whatsoever, and kept every customer satisfied. Of the greatest importance was the fact that the operation of the cold storage made absolutely no difference in the operation of the city gas service. It was sufficient to maintain the secondary pressure at a moderate level (10 pounds) to secure all of the gas the city could use at 10 inches pressure.

Apropos our early experience with incomplete expansion of the liquid when two valves were used on the shorter lines, we had the same trouble on another occasion when a mix containing less propane than we had been using was shipped us. In this case the double length coil was inadequate and liquid gas remained in both the regulator system and master meter until the supply of low grade gas was exhausted. With the ordinary butane of commerce at least 50 per cent more pipe would have to be used to secure complete vaporization, and since the boiling point of butane is higher than that of propane, the room temperature would be higher. For certain kinds of storage, like beer, the straight butane would very likely prove satisfactory, though definite experience with this problem would have to be had before conclusions could be reached.

It may be interesting to know that the steady flow of gas to the city produces a steady generation of cold that makes frequent regulation unnecessary. The expansion valve is simply set to deliver enough liquid gas to produce sufficient cold to maintain the storage at the temperature required. Only where a sudden rise in the outside temperature makes a change in the room temperature through increased or decreased radiation, as the case may be, is it necessary to change the valve.

In conclusion the cold storage business offers liquefied petroleum gas distribution companies a way in which the hills and valleys of seasonal business can be leveled. Our cold storage plant has been an unqualified success. It has opened up new avenues for business that we did not know existed, not only for the storage of commodities, but for the sale of gas as well. It brought gas service into favorable notice.

So pleased are we with our experimental plant that we are now in process of constructing a new and much larger structure whose ultimate capacity will be not less than 50,000 cubic feet. We are equipping this plant with an ammonia standby plant operated by a gas engine. While our increased gas business warrants the expectation that the larger unit will have sufficient refrigeration from the liquid gas alone, it is probable that during the summer months we shall have to resort to ammonia, in part, for our refrigeration. In any event, our refrigeration coils will be so arranged by cross valves that either the liquid gas or the ammonia may be used in the same pipes. Last fall's experience would seem to indicate that this summer's business, storage and gas, will not fall far short of this winter's average, and if this can be done we will feel that our investment, which has not been too great, is more than justified.

Philgas Rental Offer on Ranges

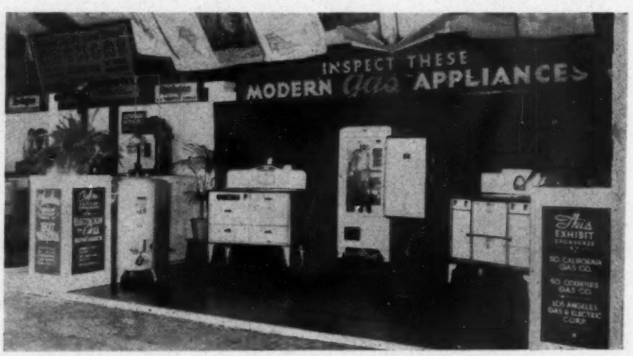
Philgas Co., Detroit, Mich., has introduced a rental range offer available to customers up to April 30. Rental payments are $1.45 per month in advance, the contract being cancellable on 30-day notice from the customer.

Gas Exhibits Featured at National Orange Show

NATURAL gas and bottled gas occupied booths side by side (see photograph below) at the annual National Orange Show, held February 15 to 25 at San Bernardino, Calif. A cooperative exhibit of the Los Angeles Gas and Electric Corp., Southern Counties Gas Co. and Southern California Gas Co. displayed modern ranges, refrigerators and water heaters, and also showed a motion picture, "The Inside Story of the Gas Industry." The picture was produced by the Southern California Gas Co.

Imperial Gas Co., bottled gas distributors with headquarters in Los Angeles, showed a full line of domestic appliances including ranges, refrigerators, water heaters, space heaters, and in addition exhibited camp outfits, two Rockgas service units, and a lighting set-up. The lights and one of the space heaters were in operation continuously.

Prospects coming into the natural gas booth were referred to the bottled gas exhibit when they were located off the gas mains.



AT RIGHT:
National Orange Show exhibits of three natural gas companies and Imperial Gas Co. (bottled gas booth shown at left).

Liquefied Gas Industry Emergency National Committee

FOLLOWING are members of the permanent Emergency National Committee recently elected by the liquefied gas industry. The original Committee consisted of 12 members, but pending an amendment to the Code three provisional members were elected to become a part of the Committee after the amendment has been approved by the Administration.

W. F. Verkamp

W. F. Verkamp, president, The Verkamp Corp., Cincinnati, Ohio (chairman).

Chas. H. Dickerman, N.R.A. representative.

Mark Anton, president, Suburban Gas Co., Verona, N. J.

R. W. Thomas, vice-president and general manager, Philgas Co., Detroit, Mich.

Morse G. Dial, Carbide & Carbon Chemicals Corp., New York, N. Y.

L. H. Spiner, manager Shellane dept., Shell Petroleum Corp., St. Louis, Mo.

Milburn Hobson, Skelgas Co., Kansas City.

Dr. R. W. Miller, Hope Construction & Refining Co., Pittsburgh, Pa.

J. J. Calahan, Hi-Heat Gas Co., New York, N. Y.

W. G. Oliver, Flamo Division, Standard Oil Co. of California, San Francisco, Calif.

A. N. Kerr, president, Imperial Gas Co., Los Angeles, Calif.

W. H. Anderson, United Motors Service Co.

H. Strickler, Protane Corp., Erie, Pa., provisional member.

Chas. H. Schuman, Chas. H. Schuman Inc., provisional member.

D. B. Geroy, Illinois Bottled Gas Co., Chicago, Ill., provisional member.

Wisconsin Bottle Gas Co. Opens Tomahawk Offices

Wisconsin Bottle Gas Co., Oostburg, Wis., has located district offices and display room in the Theiler building, Tomahawk, Wis., from which operations will be conducted also in the towns of Tomahawk, Rhinelander, Eagle River, and Minocqua, Wis. The company maintains a propane bottling plant at Medford, Wis., the fuel being shipped to the bottling plant in tank-car lots. Personnel of the company includes J. J. Verhelst, president, and W. G. Van Driest, merchandise manager. H. H. Roehrborn is local manager at Oostburg.

Changes in Regulations Affecting Compressed Gas Systems

The National Board of Fire Underwriters has printed an amendment sheet giving changes in the Regulations for the Installation and Operation of Gas Systems other than Acetylene for Lighting and Heating as adopted on recommendation of the National Fire Protection Association Committee on Gases at the 1933 annual meeting. Copies of this amendment sheet may be obtained without charge upon request.

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PROPANE
CYLINDER
VALVES
Series 133
Incorporating the soundest principle in the construction of cylinder valves yet developed . . . the result of over 12 years of progressive manufacture . . . triple metal diaphragms insure long, uninterrupted, gas-tight service . . . seat inserts and diaphragms readily renewed . . . diaphragm replacement while under pressure . . . positively sealed against leakage . . . has successfully withstood the Underwriters' Laboratories severe pressure tests of 11,250 lbs. per square inch without failure . . . so designed that years later every part may be individually serviced at a minimum cost.
Write for our Circular W describing Kerotest Brass Products for Propane Gas Service.
KEROTEST MANUFACTURING COMPANY
PITTSBURGH

American Liquid Gas Co. Asks Holtville, Calif., Franchise

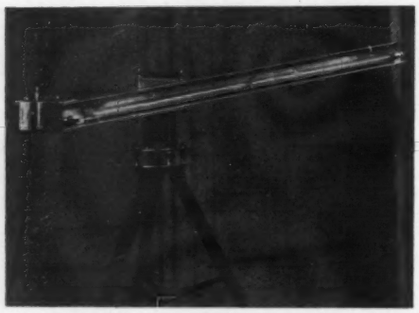
Harold W. Smith, president of the American Liquid Gas Co., Los Angeles, Calif., has applied for a 30-year franchise to construct and operate pipe lines in the city of Holtville, Calif., and to distribute liquefied gas which will be brought to Holtville in tank trucks.

More Storage Installed for Southeastern Service Corp.

Southeastern Service Corp. of Indio, Calif., early in February installed two 3,300-gallon tanks to supplement its central plant storage at Indio. With its original 4,400-gallon storage tank the company now has 11,000 storage capacity. From its central plant the company pipes gas to 332 customers and delivers tank gas to an additional 200 users.

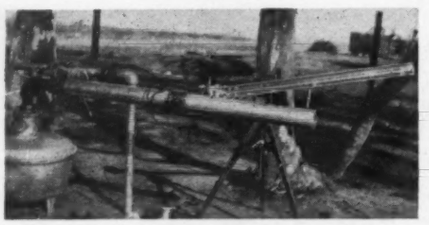
O. C. Field Plant to Make Commercial Butane-Propane

A fractioning unit for manufacture of commercial liquefied petroleum gas is being constructed at the O. C. Field gasoline plant No. 1, Huntington Beach, Calif., capacity of the new unit being 5,000 gallons per day. Two vertical storage tanks with 15,000 gallon capacity each are also being installed. Parkhill-Wade, Inc., of Los Angeles, is designing and constructing the plant, and has contracted to take the output.



Testing and Proving Displacement Meters in the Field

Field slope gauge, used by Southern Counties Gas Co. in testing large capacity meters.



A field meter, with 4-inch flow prover and slope gauge attached, ready for testing.

By W. L. KINDRED

*Southern Counties Gas Company**

TO INSURE accurate measurement of gas through displacement meters, it is essential that these be tested and serviced at regular intervals. The larger they are, the more often they should receive this attention. The Southern Counties Gas Co. has found it practical and economical to test and prove meters in the field, that have over 2000 cubic foot per hour capacity, manufacturer's rating at 2-inch differential. Trucks, with crews of two men each, have been equipped with the necessary tools, meter parts, and instruments to do this work. The facilities of the company's general repair shop are used for major repairs. The special crews visit each meter twice a year, testing it and making any minor repairs that are necessary.

W. L. Kindred

The required information for testing a field meter is the following:

1. Standard time for passage of 1 cubic foot of gas through a given orifice.
2. Pressure maintained during the test.
3. Temperature of gas during the test.
4. Barometric pressure during the test.
5. Time required for passage of a definite number of cubic feet index reading of field meter.
6. Specific gravity of gas.

To obtain this information, it is necessary to use instruments that are portable, have a high degree of accuracy, and that can be transported without impairing their accuracy.

The general type of low pressure prover, or funnel meter, has been used for many years to test field meters. We have adopted the 4-inch flow prover developed by one of the leading meter manufacturers for our work. This is a small orifice meter type prover, consisting of two pieces of aluminum pipe, one piece 3 feet long and the other 2 feet long, with a set of straightening vanes in the upstream section of pipe. Special flanges equipped with hook bolts and thumb screws are provided, and six orifice discs for six different rates, complete the outfit. As the total weight is only 13 pounds it is practical for field use.

Each of the orifice discs is marked on the outlet side with the standard time of the orifice. This standard time is the time in seconds required for the passage of 1 cubic foot of air, at the upstream pressure, when the absolute pressure at 8 pipe diameters down stream from the orifice is 30.0 inches of mercury absolute, the differential across the orifice is 8.186 inches of water, and temperature is 60° F. These discs can be made locally or can be obtained from the manufacturer. In either case they are examined carefully, all machine burrs and excess metal being smoothed out or removed from the orifice edge, thus insuring minimum wear due to handling. They are then calibrated on our 100-cubic foot bell type prover and placed in a specially designed box for field use. Periodic recalibrations are made, and any changes in standard time corrected and noted.

The advantage of this type of prover and discs over the funnel meter can readily be seen. Where the funnel meter involves the use of rubber plugs in a combination of orifices for a given load, the flow prover has only one orifice, thereby making any variation from the original calibration more easily detected. Ease in cleaning, and the elimination of wear due to the rubber plugs must also be considered in its favor.

One of the main factors and probably the hardest to measure, due to intermittent flow in testing a meter, is the pressure. For this purpose we use a slope gauge or incline manometer which consists of a brass tank 5 inches in diameter and 3 inches high, with a ¼-inch pressure connection in the top, and a 3-inch aluminum channel 49 inches long, mounted on the side at an angle of about 78°. A glass tube of about ½-inch bore, which is the smallest size recommended by the Bureau of Standards for accuracy, extends into the tank through a stuffing box and is secured to the channel. Behind the tube a scale is scribed to measure 9 inches of water pressure in 2/100-inch graduations. This whole set-up is attached to a mounting base for a tripod. Leveling screws and a level of high sensitivity, similar to those used on surveying instruments, are provided to insure accurate setting of the meniscus.

Difficulty in securing consistently accurate results with other types of manometers led to the development of this slope gauge. First, a gauge was made on a stationary mounting in the shop, and, after being checked and approved by the 1930 Pacific Coast Gas Association Meter Committee, it was used as a pattern for making field gauges, and also as a master for checking them. This gauge is still maintained for periodically checking field gauges. Results obtained by the use of the field slope gauge are much better than those gained with earlier equipment. Proofs on meters have been more consistent over a series of test runs for any one meter, thereby eliminating unnecessary adjustments that were made before, due to faulty pressure readings. Irregularities of test can now be traced directly to adjustment or mechanical defect in the meter, thus speeding up the work materially.

Temperature of the gas is taken with a bare stem thermometer, marked in 1-degree graduations, similar to those used in 1/10-cubic foot wet meters. They are checked with a certified thermometer before being used.

Any accepted Aneroid barometer which compensates for temperature, and any reliable stop watch, can be used for taking atmospheric pressure and timing of the meter, respectively.

The original equipment carried for taking gravity was as follows:

1. Portable gravity balance instrument.
2. 400-millimeter mercurial manometer.

*Presented before the Southern California Meter Association, January 25, 1933.

3. Barometer.
4. Calcium chloride bottle for drying air.
5. Hand pump.
6. Tripod.
7. Beach umbrella.
8. Necessary hose and fittings for making connections.

Recently we have added the following articles:

1. Natural gas cylinder, similar to those used in welding operations.
2. ¼-Purox regulator.
3. Fin condenser.

The balance type of instrument used has a beam enclosed in a container, the beam having a sealed float on one end and an adjustable counter-balancing weight on the other end. This balance beam is suspended by means of two crossed, phosphor bronze strips on each side. This type of suspension makes the movement of the beam free, thus eliminating errors in readings due to faulty knife edges and pin points such as are used in some types of instruments.

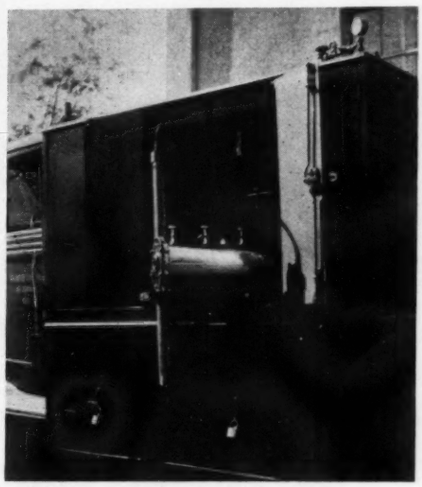
The end of the balance beam is equipped with a millimeter scale which is used in connection with a hairline indicator to show when the beam is in balance. The beam container is provided with valves for purging and making necessary connections. The 400-millimeter manometer is the high pressure "U" tube type. Mercury is changed frequently and the glass cleaned regularly, to safeguard against errors due to dirt collecting in the tubes.

The barometer is graduated in centimeters, to simplify the calculations.

With this outfit, gravity is taken by mounting the balance on the tripod near the meter to be tested. The manometer is fastened to the mounting and a connection made with the balance. Constant temperature of the balance being desirable, the beach umbrella is erected, when necessary, to shade the instrument from heat and wind. A connection is then made to the gas line and gas is taken into the balance, purged out, and a new sample introduced. After repeating this operation three or four times a sample of gas is trapped in the instrument and the beam brought to balance. At this time a pressure reading is taken from the manometer. The gas is then evacuated from the balance by means of a hand pump, and air is allowed to enter through the calcium chloride bottle. After evacuating the instrument and purging it with air three or four times the beam is again balanced, this time in air, and another reading taken from the manometer. Barometer readings are taken before and after the test. The absolute pressures of the gas and air, while the beam was in balance, are then figured, the ratio of the two absolute pressures being the gravity of the gas.

It can be seen that this method involves considerable time and effort, in purging with a hand pump. By the use of our auxiliary equipment previously mentioned, we have succeeded in eliminating this hand-pump operation from most of our field gravity tests. Instead of air, natural gas of known gravity is used for comparision with the line sample. A cylinder of gas of previously determined gravity is carried and used as a standard for this purpose.

The cylinder with a regulator attached is mounted on the truck in a convenient location near a specially designed compartment which contains the balance and a condenser. Connections are made from the cylinder to the gravity balance through the regulator and condenser, the condenser being between the regulator and balance. Serious errors due to differences in temperature of the balance and that of the gas are very probable if a condenser is not used. The truck is driven as close as possible to the meter location and hose line connections are made from the gas line to the balance. The beam is balanced in the gas line sample, then in the standard gas



Gravity outfit mounted in compartment of field service truck.

sample. The gravity of the standard gas being known, the gravity of the gas line sample can be determined by using the following formula:

$$G_1 = \frac{G_s P_s}{P_1}$$

Where:

G_1 = Gravity of gas in pipe line.
G_s = Gravity of standard gas.
P_s = Absolute pressure required to balance with standard gas.
P_1 = Absolute pressure required to balance with gas in pipe line.

This method of taking gravity has three distinct advantages over the first method.

1. Eliminates hand-pumping operation from majority of field tests.
2. Cuts down time necessary for setting up apparatus at each location.
3. Minimizes errors due to insufficient purging.

In addition to the equipment already described the crews carry 20-inch slide rules which are used for all calculations, and also carry test gauges used when by-passing gas and checking recording gauges.

Our method and procedure of testing large capacity meters is fundamentally the same as that used by other gas companies. A meter to be tested is first checked for possible overload by determining the index rate and differential across the valve while the meter is still in operation. It is then bypassed and the prover attached to the outlet connection of the meter.

An orifice disc, for a given rate, is placed in the prover; the slope gauge is attached to a pressure connection 1 pipe diameter upstream from the orifice disc; and the thermometer is placed in a connection 1 inch from the outlet end of the prover. The valve on the upstream side of the field meter is adjusted so that the reading of the slope gauge is about 8.00 inches of water. Gas is then passed through the meter and prover until the flowing temperature remains fairly constant before any observations are made; then the time required for the increase in index reading, the pressure reading of the slope gauge, the temperature at the outlet of the prover, and the barometric pressure are noted during a test run of at least 100 seconds. Ten readings each of the slope gauge and thermometer are taken during the run, and the average of these readings is used in figuring the final result. Gravity having been taken either before or after the test, the proof can be computed using the following formula:

$$t = 0.1191\ t_s \sqrt{\frac{10{,}000\ GB}{T_f\ h}}$$

Where:

t = Correct time required to pass V cu. ft. of gas.
V = Cubic feet of gas passed through meter during test as indicated by meter index.
t_s = Time (*stamped on orifice plate*) required for flow of 1 cu. ft. of air through orifice when barometer is 30.0 inches of mercury, temperature is 520° F. absolute, and differential across orifice is 8.186 inches of water.
G = Specific gravity of gas (air = 1.00)
B = Barometric pressure in inches of mercury (corrected to 32° F.)
T_f = Flowing temperature in °F. absolute.
h = Pressure drop across orifice in inches of water.

$$\text{Proof} = \frac{100\ (\text{correct time—observe time})}{\text{correct time}}$$

The proof of a meter is considered to be the average per cent error of three tests, run at different rates of flow.

1. Low rate test (about 700 cu. ft. per hour).
2. Average rate test (average of first and third tests).
3. Consumer's estimated peak hourly rate.

If the consumer's peak hourly rate cannot be estimated or is not available, test number three should be made at the rated capacity of the meter, which is the manufacturer's rating at 2 inches differential.

After making these tests on a meter, if the per cent error of all rates falls between 1% − and 1% +, the test is recorded as a final test. If it does not fall between 1% − and 1% +, the test is recorded as a preliminary test, and the meter is adjusted so that at all test speeds the per cent error falls within these prescribed limits. This operation may involve an intermediate or trial test at which time only the first and third rates are run. If they are found to be satisfactory, the second test is run and the results recorded as a final test. As can be seen, the allowable limits between rates is 2 per cent; however, with our new equipment we have been able to reduce this limit to 1 per cent in most cases. If at any time the meter cannot be adjusted so that the proof falls within the required limits, and if minor repairs will not produce

these results, it is removed from service and sent to the general repair shop.

Since we have adopted this method of testing and proving field meters and the instruments involved in its use, the results have been most gratifying. A recent check on one district showed that 75 per cent of the meters needed no adjustments whatever, whereas before fully 50 per cent needed adjusting. We feel, therefore, that we have not only speeded up our work, and attained greater accuracy, but have also taken a step toward better measurement through large displacement meters.

S. C. M. A. Hears Cottrell at February Meeting

As the principal program feature for the February 15 meeting of the Southern California Meter Association, held in Los Angeles, J. L. Cottrell, manager of the integrator division, Pittsburgh Equitable Meter Co., discussed "The Emco-McGaughy Integrator". Mr. Cottrell makes his headquarters at Tulsa, Okla. During his talk he exhibited one of the integrators and demonstrated its operation on various charts. His paper will appear in an early issue of *Western Gas.*

President C. B. Heartwell at the outset of the meeting called upon P. W. Hill to describe a new project which the Association has under way. Mr. Hill outlined a plan for compiling a practical bibliography on measurement, and exhibited specimens of reference data which are of value to men in this branch of the industry.

Fourth Edition of Handbook

In connection with the bibliography project President Heartwell referred to previous constructive work of the Association in issuing its educational course on measurement, and also its Handbook which is now in its fourth edition. This fourth edition will soon be completed and available for those who desire it, at $3 per copy. A number of new data sheets are incorporated in the latest edition of the Handbook. Orders may be placed through the Association and should be addressed to Box 1100, Station C, Los Angeles, California.

It was also announced by President Heartwell that the Annual Proceedings of the Association would be issued shortly.

Short Course Committee in Final Session at Tulsa

Details of the 1934 Southwestern Gas Measurement Short Course will be settled at a meeting of the general committee in charge, called for March 5 at Tulsa. The meeting will be held in connection with the Oklahoma Utilities Association Convention, and was called by D. C. Williams of Ponca City, chairman of the program committee. The short course dates are April 24-26, sessions being at the University of Oklahoma, Norman.

Some Corrosion Facts and "Futures"

(Continued from Page 14)

scale milli-voltmeter is used to measure the drops in the pipe. There are, however, considerable difficulties in making accurate measurements to calculate the current by either method. In the earth current meter test dependence must be placed upon non-polarizable copper sulphate electrodes. These are not always 100 per cent non-polarizable. The pipe must be uncovered and if insulated it must be stripped, both of which are expensive operations and change conditions. Using the milli-voltmeter to take a sufficient number of drops of potential in the pipe requires about 16 low resistance contacts to the pipe per mile, and that many breaks in the insulation. Errors may creep in due to the thermo-electric junctions potentials of copper to iron. In mountainous districts, variable winds occasion considerable variations in galvanic current, making it quite difficult to calculate the increase or decrease of the current intensity from one pipe section to the next.

Tests cannot be made until after the installation of the pipe line has been completed, after which it is rather late to make any changes. Tests cannot be made in an intricate maze of city pipe net-works. Tests by the drop of potential method in the pipe cannot be made for short galvanic currents which are probably more destructive than the pipe line currents. The measurement of the galvanic current is not of major importance, because it does not represent the total corrosion activity but rather the difference between the total corrosion activities of the anodic and cathodic pipe surfaces.

In view of these difficulties, how much time does it require to make surveys of long line currents and is it worth while?

Quoting from our reference No. 1, "the more recent investigation extended over a period of nearly three months and was made on nine pipe lines totaling approximately 60 miles of explored pipe." The pipe lines surveyed were chosen among others to secure "isolation from other lines and from electric railway disturbances and accessibility with respect to working and living conditions." They were also selected in flat country where there were no variations of current that occur in mountainous districts due to wind effects. This gives a speed of only about one-third mile of pipe per day under the most favorable conditions.

Mr. Shepard's survey from the standpoint of a research study was quite worth while. He reports "that galvanic currents of measurable magnitudes were found to be flowing on all pipe lines examined. As a rule, lines were found to be collecting current in areas of normal and high soil resistivity and losing current in areas of low resistivity. Soils having a resistivity of about 500 ohm-cm or less were invariably found to be highly corrosive."

On account of the high cost of making these surveys and the objections to breaking the insulation, it would appear advisable to restrict these tests to local areas where, for some special consideration such as low resistance soils, the long line current is considered likely to be causing galvanic electrolysis.

If called upon to make a survey of a transmission line in a mountainous district or one in metallic contact with other transmission lines or distribution networks, I would be interested in collecting data on the galvanic currents generated by winds and by metallic contacts to other underground structures.

What parts do the ferric and ferrous oxides play in causing galvanic currents?

The following three interesting experiments were taken in this connection:

1. A rusty pipe was cut into halves and, after one was sandblasted, they were connected side by side in a low resistance soil, each having a test wire. A heavy galvanic current, which fell off somewhat with time and fluctuated with the moisture content of the soil, flowed for the entire 15 months of the test. When they were removed the rusty pipe still had its dark red ferric rust while the bright pipe, which had been under galvanic attack, was covered by a blue-green coat of ferrous rust which, after a few minutes of exposure to air and sunlight, oxidized to the ferric. This experiment showed the hazard of sandblasted insulated pipes that are installed in low resistance soils, as replacements and extensions in rusty net-works. Had the bright pipe been imperfectly insulated, instead of being left bare, connecting it to a bare rusty pipe would have raised its n.e.p. more and greatly increased its pitting factor.

2. A pipe was sandblasted, cut into halves which were buried side by side in two trenches in a high resistance soil and connected by wires. One trench was fortified with salt and both watered. At the start there was no current; it developed after the third day to flow in the direction to attack the pipe in the low resistance soil. After removal, it was found that the pipe from the fortified soil had more of the ferrous oxide. One authority (reference No. 2) gives the potential difference between iron in the ferrous and ferric states as 0.39 volt. In Mr. Shepard's recent notable research study (reference No. 1) he found that anodic pipe surfaces are always found in the low resistance soils.

The question of why this is true naturally arises since resistance does not, as such, possess polarity. From this experiment, it was concluded that a higher n.e.p. of iron developed in the low resistance soil than in the high as a result of unequal rates of oxidizing ferrous oxide to the ferric in situations wherein the supply of oxygen is equal in the low and high resistance soils, but wherein the production of ferrous oxide is greater in the former. The galvanic current, once it begins to flow in an intensity ever so slight, soon builds up its own heterogeneity upon which it feeds.

3. In the first experiment it was a bright pipe that lost weight by an attack of a rusty

GAS REFRIGERATION JUMPS THE AVERAGE CUSTOMER'S LOAD 60% OVERNIGHT

Good reason why utilities the country over are organizing now *for "full steam ahead" with Electrolux in 1934!*

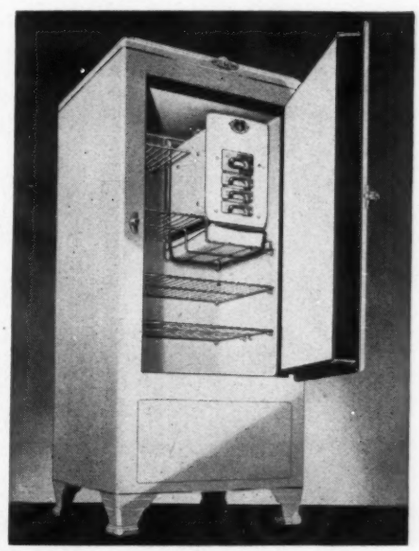
YEARS of promotional effort have pushed the average annual consumption of gas per customer to 28,000 cu. ft., according to a recent estimate.

Now—*overnight*—you can boost this yearly household load much higher . . . bring it up to 45,000 cu. ft. with Electrolux! An increase of 60 per cent!

That's an important thing to remember about gas refrigeration! And here's another: Electrolux builds valuable good will for gas as the modern fuel by providing your customers with the most modern, economical and silent refrigeration yet developed!

Today, with people again in the buying mood, Electrolux offers gas companies real opportunity to capture an important part of the profitable refrigeration market *for gas.*

The beautiful new Electrolux models embody all the modern worthwhile conveniences every woman wants . . . attractive features that will make Electrolux in 1934 easier than ever to sell!



Already, orders for the first two months outstrip all previous records! Throughout the country, gas companies are fast matching their praise for the new Electrolux with record-breaking activity!

If your company has not yet boarded the bandwagon for the biggest year in gas refrigeration history—the time to act is now! Get the new models on the floor and in your windows. Instruct your salespeople on the vital points of Electrolux superiority. Plan a definite sales and merchandising program to carry you with flying colors through 1934!

Your local efforts will be backed by the biggest advertising campaign ever run on gas refrigeration. Don't delay! Write, wire, or phone for full details and sales and merchandising help—*at once!*
Electrolux Refrigerator Sales, Inc.,
Evansville, Ind.

USES NO WATER

NEW *Air-Cooled* ELECTROLUX

THE SERVEL *Gas* REFRIGERATOR

pipe in a low resistance soil; in the second it was a bright pipe in a low resistance soil that lost to another bright pipe in a high resistance soil. This suggested that in the third experiment a rusty pipe in a low resistance soil be pitted against a bright pipe in a high resistance soil. Information was desired as to which was the more predominating factor—the conductivity of the soil or the n.e.p. of iron at the time of its installation in the soil—after a period of time in controlling the direction of the galvanic current. In other words, information was desired as to which was the greater dimension—the side or the end—of the corrosive rectangle in the final analysis. The first round went to the ferric rust but after that the low resistance soil built up a ferrous rust on its electrode which won the decision. This simple experiment indicates the Shepard rod type of apparatus, measuring conductivity of the soil, is well designed from a practical standpoint.

Cathodic Protection

What about cathodic protection, past and present accomplishments and future prospects?

The theory of cathodic protection is simple. Ferrous ions go into solution because they have a higher n.e.p. value than the hydrogen ions which they displace. One authority (reference No. 3) gives the potential of the ferrous to the hydrogen ion as 0.322 volt. Thus if the potential of the pipe is lowered to this extent by electrical drainage there will be little or no tendency for it to go into solution. In practice it is not necessary to lower the potential of the pipe to that of the soil, because the alkaline salts migrate to the cathodic pipe surface.

The principle of cathodic protection is visualized in Fig. 5. The area of the rectangle represents to some scale the rate of the loss of metal per square foot of surface. It is desired to reduce this loss; to do this the area of the rectangle must be reduced by decreasing either or both dimensions. The conductivity of the soil cannot very well be decreased so the engineer adds resistance to the flow of the current by applying insulation to the surface of the pipe. This reduces the conductivity from OS to OM and the corrosion to the small vertical rectangle of 1/6 of former value. This will increase the pitting factor so that much of the apparent value will be lost.

If the n.e.p. is lowered by cathodic protection from .6 to .1 volt, the corrosion will again be reduced to 1/6 of its former value as seen by the area of the small horizontal rectangle, but to make this reduction of potential without applying pipe resistance would require an excessive amount of current. Evidently, the sensible procedure is to apply both protective current and insulation which avoids excessive pitting and current and reduces the corrosion to 1/36 of the former value, as shown by the small square. Neither cathodic protection or insulation, independent of the other, will give the best results but either may give moderately good satisfaction under favorable conditions. Experiments should be conducted to determine what portion of the protective costs may best be allocated each form of protection.

The first cathodic protection began years ago with the operation of electric railway systems. Dynamo current leaked onto the pipes near the ends of the car lines, thus giving them cathodic protection; it leaked off the pipes near the substation where they suffered electrolysis. Drainage bonds eliminated the electrolysis and increased the range and the degree of cathodic protection. Pipe and electrolysis engineers alike saw the evils of electrolysis but were "stone blind" to the benefits of cathodic protection. Had the corrosion engineers spent more energy and displayed more intelligence in laying out their pipe lines in order to capitalize the leakage currents, and had they applied just a little less pressure upon the electric railway companies to mitigate their "vagrant" currents, both companies would have benefited. Today, as a result of his stupidity, the corrosion engineer who is beginning to get his eyes open finds it difficult to take advantage of the breaks in the game to utilize the leakage currents 100 per cent for cathodic protection. His gas mains are now full of high resistance joints and insulated gas pipes are tied in with large bare water pipes. His first job now is to "jump out" these high resistance joints in the mains and to insert others in the service risers to isolate the insulated gas distribution system from the bare water distribution system in order to secure maximum cathodic protection benefits.

In Fig. 6 are shown a few corrosion curves, taken with my standard electrode (reference No. 4). Curves A and B show from 1:00 A.M. to 4:15 A.M. galvanic corrosion on a gas transmission line during non-operative period of the electric railway substation to which pipe has drainage. A shows during the operation of the substation electrolysis on pipe before a coupling was jumped out and B shows its cathodic protection afterwards. Curves C and D indicate heavy galvanic electrolysis on the same line due to rust and low resistance soils at other locations which were beyond the influence of electrical drainage but under the influence of leakage currents. Curve E shows excellent cathodic protection afforded this pipe by electrical drainage in front of the substation.

The corrosion engineer's next problem will be to design and to build cathodic protection stations for which he must buy or produce the electric current. It is to be no longer a "vagrant" but a desirable tourist. Cathodic protection is today in its "swaddling clothes." There are many problems yet to be worked out, but it is destined to go far and accomplish much.

One problem that needs to be worked out concerns the pipe line installed a few years ago with no insulation except a coat of paint. In low resistance soils it is found to have deep pits. In view of the heavy cost to uncover, recondition and insulate it, would it be feasible to apply cathodic protection without insulating it?

Engineers have their own methods for solving problems like this. The corrosion engineer should have his "rule of thumb" method. Suppose in this case it was found the pitting factor was 25 to 1 in a bad soil. Then our present understanding indicates that for every 20 pounds of dead electrode that is electrolyzed in cathodic protection its protective effect upon the pipe line would be equivalent to 25 times 20 or 500 pounds of

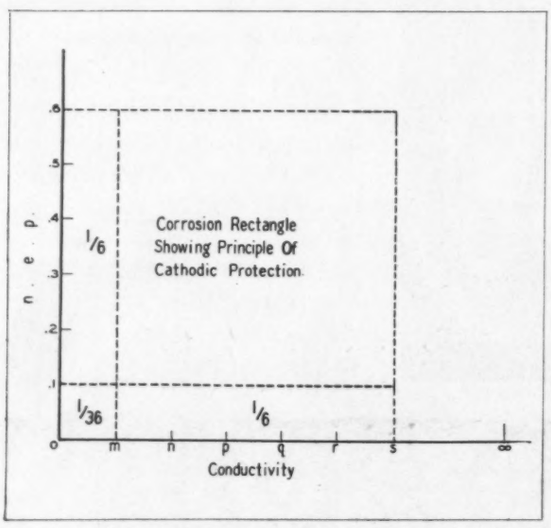


FIG. 5

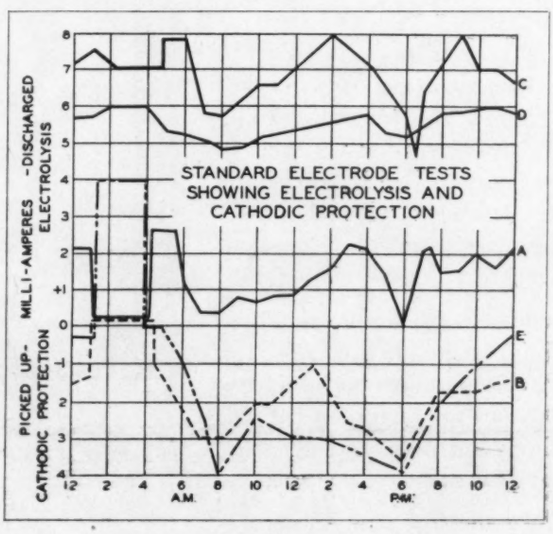


FIG. 6

LOGICAL?

Picks up favorite newspaper ... sees big P. G. & E. sales promotional ad ... reads WHY he should buy ... sees your Tie-in ad along side ... reads WHERE to buy ... what MAKE is best ... its exclusive Advantages ... how much it COSTS ... starts thinking ...

★

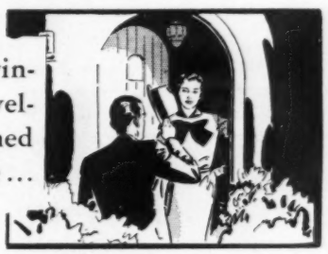
goes to the office ... to the movies ... to the country ... anywhere, everywhere his eye is caught by billposters ... truck signs ... bill-stickers ... reminded constantly to Buy Now! ... See Your Dealer! ... Buy Now! ... See Your Dealer! ... can't forget ...

★

walks down town ... passes your store ... attracted by window ... brilliant lights ... beautiful appliances ... gleaming chromium ... colorful enamel ... desire-to-own increases ... why not? ... so easy ... reasonable prices ... attractive terms ... consults wife ...

★

wife studies newspaper ads ... notices billboards ... goes window shopping ... becomes enthused ... answers doorbell ... welcomes salesman ... finds him polite, eager to help, well informed ... hears clinching arguments ... decides to act ... re-visits store ...



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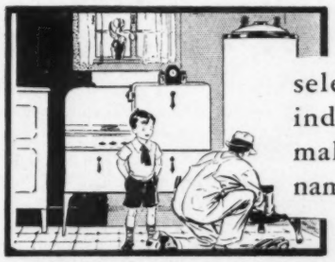

selects model ... appliance installed ... goes to work ... proves indispensible ... wins family approval ... shown off proudly ... makes new friends ... dealer follows up sale ... gets prospects' names ... makes more sales ... invests in more Tie-ins ... Repeat!

YOU BET IT IS *It works*

P·G·and E·

★ PACIFIC GAS AND ELECTRIC COMPANY ★

Owned · Operated · Managed by Californians

iron. To electrolyze 20 pounds of iron would require 1 ampere at 15 volts for one year or 131 K.W.H. which at 10 cents per K.W.H. would cost $13.10. Knowing the cost of pipe per pound installed it would be easy to decide whether it was practical to apply cathodic protection with current costing $0.10 per K.W.H.

What of the Future?

It is my expectation to live to see the right-of-ways of transmission lines studded with windmills driving small dynamo sets similar to those now in our automobiles giving 20 amperes of low voltage current for cathodic protection. For every pound of iron they electrolyze on the buried electrode, they will save the equivalent of 18 pounds, or whatever the pitting factor may be, of iron on the pipe line. I expect to see, where electric service is unavailable, the use of small internal combustion, air cooled motors, taking gas from the transmission line to drive dynamos somewhat similar to those now used in electro-plating plants to supply an oscillating current that can be traced on a pipe line with a head set.

It is my opinion that the time is propitious for manufacturing companies to develop, manufacture and sell these sets in large quantities. They have but to demonstrate that it is good practice to utilize cheap power and to use worthless pipe now rusting out on scrap piles to keep perfectly good pipe in service from going there. It is more than a matter of cost; it is a question also of the continuity of service, the avoidance of explosions, and the promotion of good public relationships.

It is my expectancy to witness most gas distribution utilities building cathodic protective systems similar to those now being used by a number of companies which have pioneered in this field. Electric public utilities may be expected to come into the picture to supply 100 per cent load and power factor current and to obtain cathodic protection for their underground lead sheaths. Today, technocratic engineers complain about the efficiency of science in increasing man's production of goods; who knows but that, perhaps, in the future they may worry about its efficiency in reducing the consumption of steel.

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No. 1: "Pipe Line Currents and Soil Resistivity as Indicators of Local Corrosive Soil Areas." E. R. Shepard, U. S. Bureau of Standards.

No. 2: "Corrosion Causes and Prevention." F. N. Speller, McGraw-Hill Book Co.

No. 3: "Standard Handbook for Electrical Engineers." McGraw-Hill Co.

No. 4: "A Proposed Standard Electrode for Electrolysis Testing." *Western Gas,* September, 1933.

"Better Copy Contest Scheduled to Close March 15

Louis D. Gibbs, chairman of the "Better Copy" Committee of the Public Utilities Advertising Association, announced March 15 as the closing date for entries in the annual "Better Copy" contest conducted by the Association.

Among the classes of advertising eligible for awards in the contest are included gas newspaper advertising (comprising all kinds of gas advertising); gas window displays; general utility advertising (all newspaper or magazine advertising not included in other classes) which will also be open to manufacturers; and campaign advertising (including best series of newspaper advertisements—institutional, appliance or sales promotion).

The contest is open to all public utility operating companies represented by membership in the Association. Entries should be addressed to Mr. Gibbs, 182 Tremont St., Boston, Mass.

Wilson and McCright at New Posts for Texas Natural

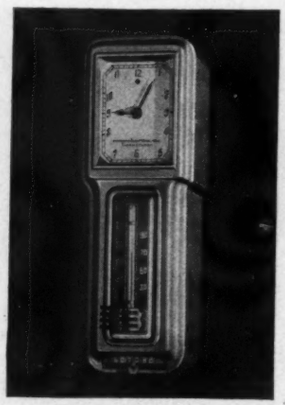
W. C. Wilson, former manager of the Texas Natural Gas Co.'s Palacios office, has been transferred as manager to Bay City, succeeding C. H. McCright, manager of the office there for the past four years. Mr. McCright will assume managerial duties at Beeville, Texas, for the company.

SATISFIED CUSTOMERS

■ Keep your customers satisfied by recommending and installing the Chronotherm*... the greatest achievement in the field of automatic heating. It provides unvarying temperatures and will entirely eliminate "Cold 70°", and save fuel by doing so. Minneapolis-Honeywell Regulator Co., 401 East 28th Street, Minneapolis, Minn.

■

MINNEAPOLIS-HONEYWELL
Control Systems



The Chronotherm*... Provides absolute unvarying temperatures and eliminates "Cold 70°".
** Formerly called Thermochron.*

Oklahoma Utilities Meet March 6 and 7

OKLAHOMA Utilities Association's 16th Annual Convention is at hand, the Mayo Hotel at Tulsa being headquarters for the March 6-7 meetings.

The program shows a number of attractions for utility members of the Association. At the opening session A. W. Conover, vice-president and general manager of the Oklahoma Utilities Co., will speak, and on the same program H. O. Caster, president of the American Gas Association, will give an address on "Problems Facing the Gas Industry." E. F. McKay, manager of the Association, will also report on Association activities.

The second general session will feature accident prevention, with demonstrations by first-aid teams. J. F. Owens of the Oklahoma Gas and Electric will speak on "Today's Challenge to Industry."

Earl W. Hodges, Henry L. Doherty & Co., New York, will be one of the speakers on the March 7 morning program on the subject "Getting Back to Work." "Trends in Public Regulation" will be discussed by E. T. McInnis, general counsel for the A. T. & S. F. Railway Co., Chicago. R. W. Hendee, president of the Oklahoma Natural Gas Co., Tulsa, will speak on "Progress in Engineering Education in Oklahoma."

On the concluding general session program are the following four features:

"Taxation Today and Tomorrow," Ford C. Harper, Oklahoma City, manager Oklahoma State Chamber of Commerce.

"Getting the Most Out of Your Association," Kurwin R. Boyes, New York, secretary American Gas Association.

"Utilities and the National Recovery Program," J. A. Whitlow, Tulsa, vice-president, Public Service Co. of Oklahoma.

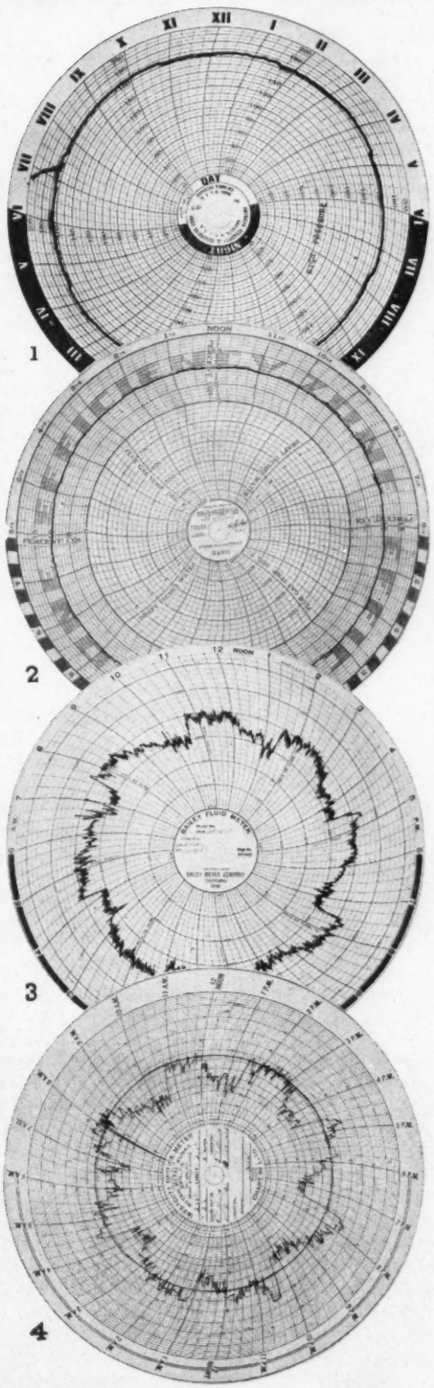
"Oklahoma's Anti-Minimum Bill Law and Its Relation to Promotional Rates in the Gas Industry," B. P. Stockwell, Oklahoma City, utility representative southern division, Recording and Statistical Corporation, New York.

Tabulation of State Fire Laws and Regulations

A 48-page, 8½x11 in. tabulation of state laws and regulations on fire prevention and fire protection subjects has been published by the Executive Office of the National Fire Protection Association in order to make available for general reference use the results of the 1932-1933 survey on this subject. This list, arranged by states, gives the title of the law or regulation, the enforcing authority, the character of the subject matter covered and some general comment, but does not give the detailed text of the laws and regulations. Copies may be obtained from the N.F.P.A. Executive Office at $1.00 each.

Minot, N. Dak., to Ask $1,523,000 for Pipe Line Construction

The city manager of Minot, N. Dak., has been empowered to formulate a request for a $1,523,000 loan from the Public Works Administration to construct a pipe line to bring natural gas from the Montana Dakota Power Co.'s line at Williston to Minot.



24-hour record in a plant of eight 260 H. P. boilers operated at 220% of rating at peak loads.

No. 1 STEAM PRESSURE — showing close limits within which a single control maintains steam pressure.

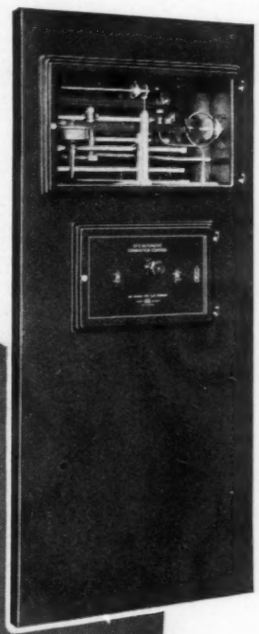
No. 2 RECORDING CO_2 METER. Note high CO_2 and very slight fluctuation.

No. 3 STEAM FLOW METER. Steam demand fluctuated rapidly and over an extremely wide range.

No. 4 GAS FLOW METER. Note how closely the rate of gas flow follows the rate of steam demand.

ACTUAL installations, actual plant figures and operating records, PROVE the ability of the D F C Automatic Combustion Control to...

- *wipe out preventable losses;*
- *maintain steam pressures within 2% plus or minus;*
- *hold CO_2 at highest point; excess air at lowest.*



Investigate the new, amply proved - - - - -

D F C
AUTOMATIC COMBUSTION CONTROL

MODEL GND, shown here, is for application to gas-fired power or heating boilers operated under natural or induced draft, and fired with atmospheric type burners.

It is a truly PROPORTIONING control—not a position control. Fuel input is controlled by *balancing* the gas pressure at the burner header with the steam pressure in the boiler. Fuel and air are proportioned by *balancing* the furnace draft with the gas pressure in the burner manifold.

Thru automatic, *continuous* and *immediate* adjustment of the fuel and air input to suit steam demand, the highest possible furnace efficiency is attained. In addition, the DFC Automatic Combustion Control is designed and constructed for complete safety and trouble-free operation.

Write for Bulletin 320 W

THE DENVER FIRE CLAY COMPANY

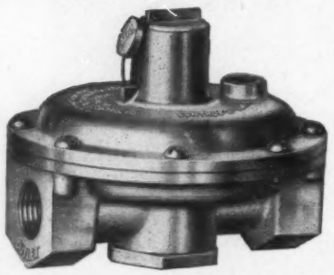
DENVER DFC COLO. U.S.A.

BRANCHES AT SALT LAKE CITY, EL PASO, AND NEW YORK

CONTROL-O-GAS

Low Pressure

Regulator



Simple in Construction
Efficient in Operation
Economical
Assures Constant Heat

THE Control-O-Gas Low Pressure Regulator is a *New* governing device developed to meet the demands for safety, economy and efficiency in all gas burning appliances.

Exclusive Distributors

Payne Furnace & Supply Co.
Since 1914
Beverly Hills, Calif.

The reason for the long life and low maintenance cost of cast iron pipe is its effective resistance to rust. Cast iron is the one ferrous metal for water and gas mains, and for sewer construction, that will not disintegrate from rust. This characteristic makes cast iron pipe the most practicable for underground mains since rust will not destroy it.

For further information, write to The Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, 309 Peoples Gas Bldg., Chicago, Ill.

CAST IRON PIPE

Look for this **Trademark**

Missouri Utility Men In Session April 19-20

THE 28th annual state convention of the Missouri Association of Public Utilities will be held April 19 and 20, 1934, at the Elms Hotel in Excelsior Springs, Mo. President Fred Karr will preside at the business sessions. The Association comprises virtually all of the privately-owned gas, electric, water, and street railway companies in Missouri.

Fred Karr

Judge H. O. Caster, president of the American Gas Association, will be one of the speakers. The program, now almost complete, is in charge of the following committee: C. A. Semrad, chairman, St. Joseph Railway, Light, Heat, and Power Co., St. Joseph, Mo.; C. J. Prashaw, Missouri Power & Light Co., Kansas City, Mo.; Dudley Sanford, St. Louis County Gas Co., Webster Groves, Mo.; R. L. Shuck, Springfield Gas & Electric Co., Springfield, Mo.; H. E. Scheark, Kansas City Power & Light Co., Kansas City, Mo.

An open forum for the discussion of local utility problems will be held on the night of April 19, with D. W. Snyder, Jr., Missouri Power & Light Co., Kansas City, Mo., as chairman. The annual dinner and dance will be on the evening of April 20.

The officers of the Association are: President, Fred Karr, St. Joseph Gas Co., St. Joseph, Mo.; first vice-president, D. W. Snyder, Jr., Missouri Power & Light Co., Kansas City, Mo.; second vice-president, C. E. Michel, Union Electric Light & Power Co., St. Louis, Mo.; third vice-president, C. F. Farley, Kansas City Power & Light Co., Kansas City, Mo.; secretary, N. R. Beagle, Missouri Power & Light Co., Jefferson City, Mo.; assistant secretary, Jesse Blythe, 101 West High St., Jefferson City, Mo.; treasurer, Hermann Spoehrer, Union Electric Light & Power Co., St. Louis, Mo.

New officers for the coming year will be elected at the closing session April 20.

Summary of Retail Appliance Sales in San Diego County

J. CLARK CHAMBERLAIN, secretary-manager for the Gas Appliance Association of San Diego County, Calif., has prepared a summary of retail gas appliance sales in San Diego County for 1933 on the basis of figures obtained from dealers and distributors. Following are the estimated 1933 sales for various appliances: gas ranges 2,000; radiant and small portable heaters 1,400; circulating heaters 950; floor furnaces 165; unit furnaces 108; gas-fired boilers 10; gas steam radiators 800; automatic water heaters 1,250; non-automatic water heaters 1,000—representing a total of 7,583 appliance units estimated to have been sold in the county. Circulating heater sales were approximately double those of 1932 and unit furnaces, boilers and gas steam radiators also showed increases.

Extensive advertising is being conducted currently by the Association. Eleven 50-inch newspaper advertisements were carried in January, plus 15 billboards, street car cards, 80,000 gas-bill messages, window cards, and short radio announcements. Also, a series of 14 quarter-hour radio programs was added for the month of January. Two San Diego stations put the gas message on the air in morning hours, the broadcast featuring gas for home heating.

Window and Floor Display Service for Lone Star

The advertising department of the Lone Star Gas System has organized a new window and floor display service to aid the System's properties in using lobbies and windows to present proper types of modern and efficient gas appliances to customers. Chester L. May, vice-president and general manager for the Community Natural Gas Co. and Texas Cities Gas Co., Dallas, Texas, initiated the activity.

The service is available to all offices and includes compact window and floor settings for major appliances. First on the program is the building of a number of model gas kitchens which, with a planning service, are available to home owners, architects, building supply dealers, contractors and others who are interested in building operations. The model kitchens in Fort Worth were recently inaugurated with a cooking school conducted by Albertine Berry, home service director of the System, in the division's auditorium January 24, 25 and 26.

"Meet Mrs. Modern"—American Stove's Spring Portfolio

The American Stove Co., Cleveland, Ohio, has just brought from the press a new portfolio entitled "Meet Mrs. Modern", which outlines the company's Spring, 1934, advertising and promotional program. Included in the portfolio are full size samples of Spring advertising to be carried in national magazines, in line with the company's program of national advertising over the past 15 years.

Kitchen modernization is stressed in the American Stove portfolio and merchandising helps for 1934 are described. A number of new handbook sheets, and a circular descriptive of the company's new 2300, 2400, 1900, and 1900 with monel metal, series Magic Chefs have also been prepared for distribution.

Long Beach Sales Hold Up

Gas sales at Long Beach, Calif., for 1933 fell only 2½ per cent under 1932, in spite of the fact that gas was off the city for about two weeks following the March 10 earthquake. According to E. S. Bryant, assistant superintendent of the Long Beach Gas Department, total sales were 2,942,441 M c.f. for the year, of which 2,362,18 M c.f. were domestic sales. The domestic sales figure was 2-3/10 per cent under 1932.

Refrigeration Contest Details Announced

FROM the Refrigeration Committee of the American Gas Association comes the announcement of a second national contest on sale of Electrolux gas refrigerators. The 1934 campaign in the introductory portfolio which has been prepared is described as a "Good Old-Fashioned Sales Contest." Known as the "Go-Getter Contest" this 1934 drive will take for its theme Peter B. Kyne's famous story "The Go-Getter." Copies of this widely used story will be put into the hands of gas company salesmen as a campaign "build-up." Numerous industries have successfully used "The Go-Getter" motif, and in selecting it for gas refrigeration the committee in charge feels that a sound choice has been made.

Running from April 1 through June 30 this contest will group gas company participation into six major divisions.

Division A is made of a limited number of metropolitan companies: Boston Consolidated Gas Co., Consolidated Gas Co. of New York, Brooklyn Union Gas Co., Kings Appliance Corp., Brooklyn Borough Gas Co., The Philadelphia Gas Works Co., Washington Gas Light Co., and Southern California Gas Co.

In each of the six divisions first prize will be a "Blue Vase," featured in Peter B. Kyne's story as the object of "The Go-Getter" hero's search.

In Division A monetary prizes for first, second and third places of $500, $300 and $100 respectively will be awarded. In each of the other five divisions first prize will receive $300, second prize $200, third, fourth and fifth prizes, $100 each. In addition, there will be separate monthly prizes of $100 each for April, May and June, offered in each division.

The number of meters registered will determine the division in which gas companies are entered. Companies may enter their branches as separate units, or may combine all branches and register as one unit.

Division B is for companies with more than 50,000 meters; Division C 20,001 to 50,000 meters; Division D 5,001 to 20,000 meters; Division E 1,001 to 5,000 meters; Division F less than 1,000 meters.

Three special mailing pieces have been prepared, two impressive rotagravure broadsides, and a special booklet on the air-cooled Electrolux. Wall posters, campaign Blue Vase buttons, and other miscellaneous helps will also be available.

Companies are urged to tie in with their own "Go-Getter" sales contests, offering a blue vase and cash prizes to their own champion go-getters.

National advertising of Electrolux during each month of the campaign will reach upwards of 12,000,000 homes through copy in national magazines, the advertising featuring the gas industry as "A Billion-Dollar Industry Faithfully Serving 15,000,000 Modern Families."

R. A. Malony, assistant sales manager of The Philadelphia Gas Works Co., is chairman of the 1934 refrigeration Committee, other members being Cyrus Barnes, Charles H. Tenney & Co.; W. E. Bolte, The Brooklyn Union Gas Co.; B. O. Brown, Electrolux Refrigerator Sales, Inc.; J. D. Dingwell, Jr., Washington Gas Light Co.; Stanley Jenks, Northern Indiana Public Service Co.; C. K. Patten, Dallas Gas Co.; Clyde H. Potter, Southern Counties Gas Co.; Wm. F. Reid, Manufacturers Light and Heat Co.; F. E. Sellman, Electrolux Refrigerator Sales, Inc.; Wm. R. M. Very, Philadelphia Electric Co.; E. C. Whitcomb, Lone Star Gas Co.

"The Go-Getter Contest" is based on installations (not sales) made on each company's system during April, May and June, whether made by company or dealers. Registration for the contest must be made before April 15 on forms provided by the committee, which may be addressed in care of the American Gas Association, 420 Lexington Avenue, New York City.

Action Imperative on Panhandle Gas Wastage

IMMEDIATE legislative action is imperative in Texas if the appalling wastage of natural gas in the Panhandle fields is to be halted. Estimates place the present daily wastage at one billion feet—sufficient gas blown to the air every two and one-half days to supply the daily requirements of the entire United States.

The present wastage situation in Texas is looked upon by many as the direct result of the Texas Railroad Commission's failure to force pipe line companies to take gas ratably from all producing wells. Prior to 1933 Texas laws permitted blowing gas from natural gasoline plants only when the gas came from oil wells, or in limited quantities from gas wells where commercial markets existed for the balance. Approximately 500 million feet daily are estimated to have been wasted under these statutes, but this staggering total was doubled when the last legislature changed the law to permit blowing residue gas in unlimited quantities regardless of where it originated.

Passage of this law permitting unrestricted waste, together with increases in natural gasoline prices, has brought rapid construction of new natural gasoline plants and increased capacity for many of the 50 plants already in operation in the Panhandle. If further price increases are recorded for natural gasoline more plant construction may be expected.

Various estimates have placed the life of the Panhandle field at from 25 to 40 years, original reserves being reckoned at approximately 16,100,000,000 M c.f. of recoverable gas. Of the 4 trillion cubic feet already produced it is estimated that 75 per cent has been ruthlessly wasted. Continuance of wastage on the present scale according to some authorities may be expected to reduce the probable life of this largest of gas fields to as low as 10 years, involving the loss of huge quantities of oil which might be recovered if gas pressures were properly conserved.

Texas Panhandle land and royalty owners are now bringing court action against a number of gasoline plants for alleged blowing of natural gas into the air, but even if these proceedings get the desired results wastage is proceeding at an alarming rate in the interim.

Organization of the Panhandle Conservation Association, announced elsewhere in this issue, will bring together land and royalty owners and others vitally interested in conservation. It is to be hoped that educational work of this and other organizations will put the facts before the Texas public so forcibly that a speedy legislative remedy will follow.

Sixth Annual Golf Play at Brentwood for Oil and Gas Men

The Sixth Annual Petroleum Golf Tournament was held at Brentwood Country Club, Santa Monica, Calif., February 22, with more than 200 oil and gas men of Southern California entered in the play in spite of threatened rain. Low gross prize went to Earl Neitzel of Richfield Oil Co. with a par 71. Low net was won by Ed. Conrad, purchasing agent of Standard Oil Co.

Tatum Buys Mississippi Properties

F. M. Tatum, acting as trustee for other interests, purchased the distribution properties, pipe line and franchises of the Public Service Corp. of Mississippi, at public auction, February 12, at a cost of $300,000.

E. W. Kelly, Manager at Duluth, Dies

E. W. Kelly, manager of the Duluth (Minn.) gas division of the Water and Light Department, passed away January 30 after 23 years activity in the gas industry both in an executive and consulting capacity. His successor has not been announced.

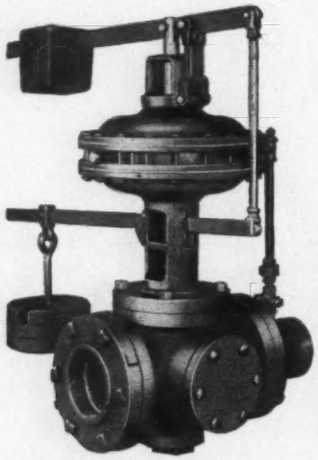
Peoples Light Co. Completes Davenport Change-Over

The Peoples Light Co., Davenport, Iowa, completed change-over operations from manufactured to natural gas early in February. The company late in 1933 entered into a 14-year contract with the Natural Gas Pipeline Co. of America for gas for service to its 14,000 consumers. A 6-mile, 8-inch lateral was laid by Peoples Light from the pipe line company's main line at the Buffalo terminal to the western limits of Davenport to bring the supply to that city. Harry E. Littig is general manager.

Ingersoll-Rand Develops New "Type XVG" Line

Ingersoll-Rand Co., Phillipsburg, N. J., has placed on the market the "Type XVG" line of direct-connected gas engine driven compressors. The new line is built in four sizes of 60, 125, 190 and 260 H.P., with two, four, six and eight power cylinders respectively, two power cylinders for each compressor cylinder. A booklet describing the new line is available upon request to the company.

For Sensitive Regulation of Medium Pressures



THE growing demand for sensitive regulation of medium gas pressures is met in a new addition to the C-F line of regulators. Patterned after the well known Fulton Duplex Low Pressure Regulator, it employs a compound leverage with facilities for delicate weight distribution. The result is great sensitiveness and positiveness of action. This new regulator is adapted for inlet pressures of 50 to 100 pounds and outlet pressures of 5 to 10 pounds. It may be equipped with "V-port" valves for operation under light loads and will still allow full passage of gas at peak loads. Bulletin 4031 giving full description on request.

CF

The Chaplin-Fulton Manufacturing Co.

REPRESENTATIVES

Westcott & Greis, Inc.: Dallas-Tulsa
Jno. W. Crawford, Sales Engineer: Los Angeles
Parsons Engineering Co.: Los Angeles-San Francisco

28-40 Penn Avenue Pittsburgh, Pa.

FULTON DUPLEX MEDIUM PRESSURE REGULATOR

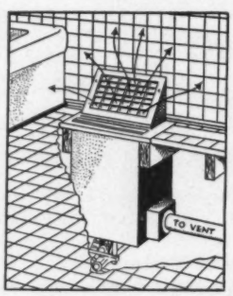
WARD WALL-HE-TOR

Economical gas heat for the bathroom

Now for the first time in gas history, a vented appliance, ornamental, and taking up little space, is available for bathrooms. This has been made possible by the Ward Wall-He-Tor, which will heat the average bathroom for as little as half-a-cent an hour, depending upon local gas rates.

Wall-He-Tors are ideal for dens, breakfast rooms, and small bedrooms. They may also be used as unit systems for houses without basements.

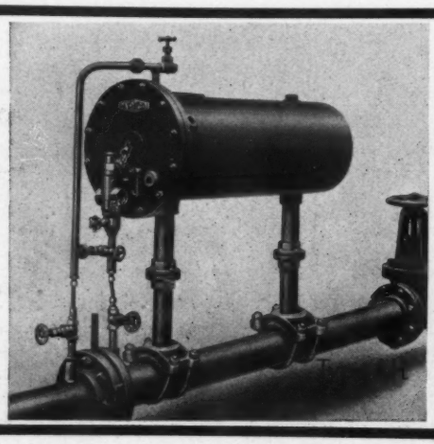
Write for literature, terms, and prices. Ask about Ward Floor Furnaces with Bilt-In Thermo-Control.



WARD HEATER COMPANY
1800 W. Washington Blvd.
Phone PArkway 9171 Los Angeles, Cal.

PAPICO improved Natural Gas ODORIZERS

Improved Papico Odorizers increase the rate of injection when the gas flow increases, reduce the rate of injection when the gas flow diminishes, shut off at no flow and resume injection when the gas starts to flow again. This insures a sufficient amount of odor in the gas at all times, prevents waste of odorant and as the equipment operates automatically, relieves the distribution department of the responsibility of manually changing the rate of injection when the gas flow increases or decreases. Papico Adorizers are on the job 24 hours per day. Ask for new Bulletin 05.



HARRY F. HALDEMAN, Inc.
411 W. 5th St., Los Angeles, Calif.

Selling Gas Heat in the Chicago Area

(Continued from Page 11)

lic Service Co. and the Western United Gas & Electric Co. had similar results.

Prior to the start of this campaign The Peoples Gas Co. had made a practice of employing heating contractors for the installation of conversion burners and at the beginning of the campaign had a list of 43 contractors who were experienced in the installation of conversion burners. As the campaign progressed, we increased our list of contractors to 82. About 40 of these contractors, or approximately 50 per cent, put in window displays which we supplied and turned leads over to us or made the sale themselves and bought the burner from us, or in some cases direct from the manufacturer of a burner not handled by us. We sold the standard package burner to the contractors for $82 delivered only, including the limit controls and plain room thermostat. As we had an agreement with the contractors of $45 flat for installation work, the difference of $22.50 was the contractor's sales profit, which, plus the $10 profit that we estimated a contractor would make on the installation work, made a total profit of $32.50 to a contractor on a sale made by himself. A few of the contractors really put some effort into sales and as a result they sold about 275 jobs themselves. Most contractors, however, were only interested in the installation work and turned their prospects over to us, although we paid them no commission for their leads, but we did, of course, award them the job of installation. We also gave them the installation of at least one job sold by us for every sale made by them. The contractors were quite happy with the entire arrangement, judging from the reports we received. The employees of the heating contractors also benefitted greatly from the heating campaign, and were very friendly in their remarks and compliments paid to the gas company for its courage in creating work for so many individuals at a time when work was needed. In fact, there can be no doubt that the heating campaign contributed to the business upturn in Chicago to a very marked extent.

On November 1 we decided to call back on all previous sales for the purpose of checking up on how the costs were running and whether or not the customers were satisfied with gas heat. This call-back system naturally cut down our sales considerably during November and December and we discontinued the practice about the middle of January as we felt we had covered the field sufficiently to accomplish our purpose, which was to hold down removals on account of higher cost than the customer was expecting. We believe we will follow this same call-back system next fall, but perhaps will start it a month later.

The 1934 Program

As to our plans for 1934, the problem that confronts us this year is radically different from the situation that faced us when we began our work on its present large scale.

For the most part the easy sales have all been made, and we must now sell our 1934 quota mostly to families which we contacted but were unable to close last year. Our great three-company quota of 37,000 jobs for 1934 can be attained only by systemizing and intensifying our selling methods, and by the salesmen's use of a more complete and effective sales presentation.

But going even back of that—it is our feeling that we are selling not only a piece of mechanical equipment and a gas supply service but also a certain obligation to see that that equipment and that service gives the customer constant satisfaction. *Only on this solid rock of customer satisfaction can any great sales structure be erected.*

For that reason some weeks ago we started a service man's supplementary training course which to date has been attended by about 400 men, coming not only from our three companies but also in part from local manufacturers of equipment. Subjects covered in the course included a General Introduction, General Outline of Space Heating, Heating Applications and Gas Fired Heating Equipment, Manufacture and Distribution of Gas, Gas Heating Controls, Gas Burning Equipment, Conduct on Customers' Premises, and Inspection, Adjustment and Servicing of Gas Heating Systems. Upon completion of the course each man was given a service manual. The men who have attended have obtained a better perspective on the campaign as a whole in addition to a great deal of information on their specific duties.

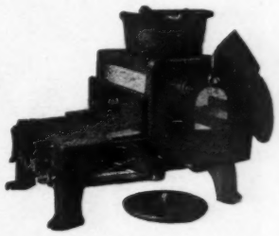
During the week of January 29 to February 2, inclusive, the salesmen, heating engineers and division sales directors from all three companies, numbering some 320 men, were brought into Chicago for a midwinter sales conference, which wound up with a banquet at the Union League Club on Friday night.

During one session each of the 11 sales directors spoke on some aspect of the sales process such as "Locating Prospects," "Getting Into the Home," "Getting Permission to Present the Complete Case," and so on. In these talks the sales directors discussed specific field experiences. Another highly valuable session introduced two speakers who freshened up the salesmen's enthusiasm by discussing the thing we are selling from their own specialized viewpoint. A well known doctor talked on "Health for the Family" with emphasis on temperature conditions. A woman, president of the Chicago Housewives League, talked on gas house heating as a further and final step in modern woman's emancipation from household drudgery. The last business session was given over largely to a presentation of the direct mail campaign upon which we are pinning our hopes to a great extent for success in 1934.

Direct Mail Procedure

Our campaign management felt during the first six months of our campaign that direct mail had no place in our advertising scheme of things. It is felt now that the time has arrived to use this powerful sales force in order, first, to shock the public of the Chicago area into a new awareness of our proposition, and second, to create the vehicle on which we could obtain the systemizing and

JOHNSON NO. 118 BENCH FURNACE FOR EVERY SHOP USE



In shops all over the country, you'll find the Johnson No. 118 a popular, useful tool. Melts metals, heats soldering coppers, long rods, etc., and is very efficient for heat-treating small parts. No forced air blast is needed.

COMBINATION TORCH AND MELTING POT

The Johnson No. 8 Torch and Melting Pot is a useful, low cost unit that will serve a multitude of purposes. Melts up to 22 lbs. of lead. Heats soldering coppers and may be used for pre-heating work. Torch is adjustable to any angle or may be removed. Write for details and prices.

A POPULAR MELTING FURNACE

The Johnson No. 300 Melting Furnace has a capacity of 150 pounds. Three powerful burners supply quick, intense heat without a blower.

Other Johnson Melting Furnaces Made in a Wide Range of Sizes. Write for Catalog and Price List.

JOHNSON GAS APPLIANCE CO. Cedar Rapids IOWA

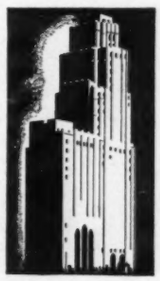
Pacific Coast Representative—C. B. BABCOCK CO. 135 Bluxome St., San Francisco, Calif.

GENERAL CERAMICS COMPANY

REFRACTORIES

Refractories for conversion burners, space heaters, and circulating heaters. Made to exacting standards of quality—standards which are maintained by modern production methods careful workmanship, and accurately controlled burning. Our engineers will gladly cooperate on new designs, alterations, production economies, etc.

General Ceramics Company, 71 West 35th Street, New York



In SAN FRANCISCO

the

WILLIAM TAYLOR HOTEL

Overlooking the Classic Civic Center

28 Stories—All Outside Rooms

Modern Hotel Luxury at Moderate Rates

Single room with bath: $3.00, $3.50, $4.00
Double room with bath: $4.00, $5.00, $6.00

WOODS-DRURY CO., Operators

James Woods, Pres. *Ernest Drury, Mgr.*

NOW READY

The "BLUE BOOK"

PERSONNEL DIRECTORY *and* BUYERS' GUIDE *of the* GAS INDUSTRY

1 9 3 4
Edition

This directory gives the personnel of gas utility district offices as well as headquarter companies, arranged by states and including distributing companies, pipe line companies, producing companies and holding companies. Each distributing company lists the kind of gas served—pressure—B.t.u. content—number of meters and indicates whether or not each company merchandises.

Correct as of January 1st, 1934, it is the most complete and up-to-date directory available—**includes the entire United States.**

Published in convenient Pocket Size! **5x7 in.**

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20 or more $1.50 each

MAIL COUPON TODAY!

WESTERN GAS, "Publishers",
810 South Spring St.,
Los Angeles, California.

Date.....

Please send me.....**copies of the "Blue Book" Personnel Directory 1934 edition of the Gas Industry at $**.....**per copy, for which I enclose remittance of $**......

Name.....

Address.....

.....

By.....

intensifying of method that I referred to a moment ago, the idea being to concentrate and focus our sales presentation this spring and summer directly upon 150,000 of the most qualified prospects for gas house heating in this Chicago area.

All of our salesmen are now busy compiling the names for the first month's mailing, each man putting together a list of at least 100 names. A few days from now he will receive a box containing the three mailing pieces, all signed, stamped and sealed and arranged in the same order as the list which he has turned into headquarters. Thus each day he can hand to the mailing clerk in his division the pieces which should go out that day to the prospects on whom he is to make a personal call about a week later. Three days later he sends out the second piece and three days after that the third piece.

The third piece is a letter signed by the salesman's sales director in which the sales director announces that the salesman will soon call upon the prospect in order to present to him a gratis copy of a new book called, "Your Basement". This book, measuring about 7x9 inches, is bound in stiff covers and contains 40 pages of practical common sense suggestions for remodeling the typical residence or two-flat basement. Most of the pages are given to a comparison between a small photograph of an actual basement and a large architect's sketch of the basement as remodeled according to our suggestions. We feel that this book will assure a favorable reception to our salesmen when they make their call, and we feel that the whole campaign under the careful supervision which we are going to give to it will result in a new efficiency and a new enthusiasm on the part of our sales organization.

In closing I should like to say a word about our new form of newspaper advertising. We are using testimonials on a scale probably never before attempted by any advertiser in this or a related business. In three-quarter page space satisfied customers of Chicago and suburban towns are telling just why they like gas heat. Most of the space in the ad is given to photographs specially posed by our photographers, and all of this to the end that newspaper readers of the Chicago area may understand that gas heat is not a luxury for the moneyed few but a practical, economical household necessity for every home that wishes to enjoy the best form of house heating.

To show you how effectively these testimonial advertisements are hitting the mark, one of the families pictured in a recent testimonial ad reports that on the day after the ad appeared 81 telephone calls were received from interested people throughout the city.

We have set a quota in The Peoples Gas Co. for 1934 of 25,000 jobs, the Western United quota is 4,000 jobs and the Public Service Co. has set 8,000 jobs as its quota. The latter two companies, owing to their distribution facilities, have found it necessary to close certain parts of their territories to the gas heating campaign due to the fact that they have already taken on as much new business in these territories as they can profitably handle.

However, if all three companies make

their quota for 1934, and it is my personal opinion that each one of the companies will make its quota, then the companies will have sold from July 19, 1933 to December 31, 1934 a total of 54,000 installations, which is the total amount of new business desired by the three companies on or before January 1,1935.

New Detroit Jewel and Garland Range Lines Announced

NEW lines of the Detroit Jewel and Garland gas ranges have been announced by the Detroit-Michigan Stove Co. Catalogs No. 141 and 34-26 describing the lines are available upon request to the company.

Illustrated below is a Detroit Jewel Senior Table Model, available in porcelain with the following color trims: Ivory with brown trim and brown design on the front panels; ivory with brown trim and green design; plain ivory with brown trim; plain white with brown trim.

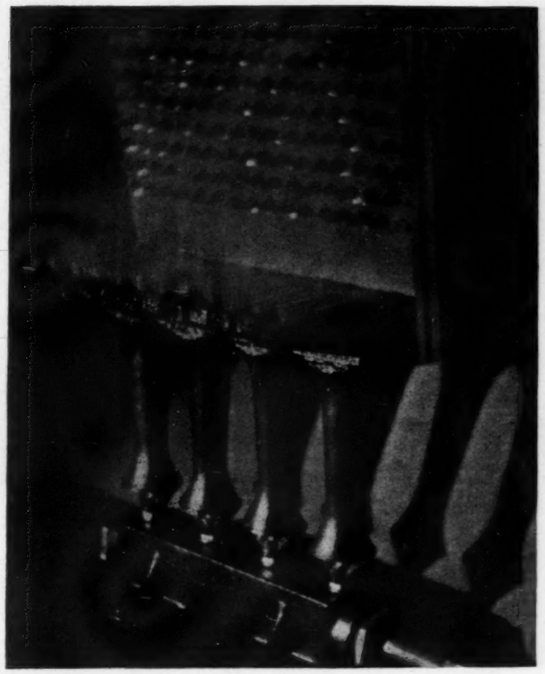
Among the features of all Senior Table Models are: Cover for cooking top which rolls back on roller bearings and serves as

Detroit Jewel Senior Table Model.

splasher when range top is in use; easily cleaned porcelain tray around the four top burners; one-piece porcelain finish baking and broiling oven with all corners rounded for easy cleaning; double supported and welded frame construction; heavy one-piece cast-iron cooking top; automatic top lighter; porcelain top grates; two utility drawers, each with roller bearings; slide-out drip pan under top burners; slide-out oven bottom tray for easy cleaning; Detroit Jewel oven heat control with dial on front panel; complete insulation on oven and drawer-type broiler. All models are made for manufactured, natural or bottled gas. Insta-Matic Clock Controls are available on all Senior Table, Junior Table and Master Models.

Two New Members Elected to Portland Gas & Coke Directorate

Frank H. Ransom, president of the Eastern & Western Lumber Co., and T. B. Wilcox of the Wilcox Investment Co., were elected to the board of directors of the Portland (Ore.) Gas & Coke Co. at the annual meeting of stockholders February 19.



N.G.E.

TYPE W GAS BURNERS *for* SQUARE C. I. BOILERS and STEEL BOILERS

N.G.E. Gas Burners
N.G.E. Liquid Level Controllers
N.G.E. Wilgus Gas Fuel and Pressure Regulators
Webster Radiant Gas Burners
Surface Combustion Industrial Furnaces
Janitrol House Heat Machines

Developed to meet the demand for an economical low pressure conversion burner, the N.G.E. Type W is designed to bring recognized N.G.E. burner efficiency into low pressure industrial and commercial heating fields. Type W burners offer the highest boiler efficiency with perfect combustion on the minimum draft tension. All burner units in a battery burn uniformly, because manifolds are of ample size and burners are accurately machined and fitted. Type W is easy to install and is made up in units as required, each unit having a capacity of approximately 139.5 square feet of steam radiation or 1 boiler horsepower, with gas containing 1150 B.T.U.'s a cubic foot at 6 inches of water manifold pressure.

NATURAL GAS EQUIPMENT INC.

Petroleum Securities Bldg. LOS ANGELES, CAL.
1123 Harrison Street SAN FRANCISCO, CAL.

LOOK TO THE PIONEERS FOR CONTINUED LEADERSHIP

The Goodman Stopper

The Reliable Shut-off for Street Mains

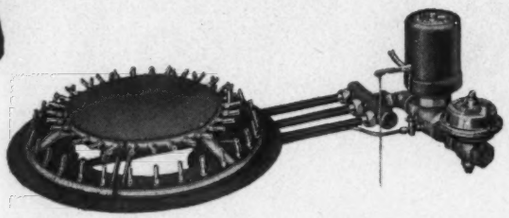
Equipped with Improved Patented Locking Sleeve, which locks both handles to the pipe. Stopper cannot slip. Gas cannot pass.

Safety Gas Main Stopper Co.
523 Atlantic Avenue, Brooklyn, N. Y.

Pac. Coast Rep.: C. B. Babcock Co.
135 Bluxome Street
San Francisco, California

BARBER AUTOMATIC BURNERS

Illustrating No. 324-B Barber Automatic Burner installed in a round boiler. Note its simplicity of installation and the excellent scrubbing action of the flame.



Our Engineering Department will gladly furnish you practical, as well as technical co-operation in specifying Barber Burner Assemblies to especially suit and fit the grate areas for which they may be required.

WRITE us today for our NEW CATALOG and our latest attractive DISCOUNTS. Let us tell you how we assist with literature and co-operation that will help you to capitalize on the demand for Barber Automatic Heat.

THE BARBER GAS BURNER CO.

3704 SUPERIOR AVE. CLEVELAND, OHIO

A. E. Walker General Manager of Sales for Republic Steel

A. E. WALKER, who has been assistant vice-president in charge of sales for Republic Steel Corp., Youngstown, Ohio, since its organization, has been appointed general manager of sales for the company, according to announcement of Norris J. Clarke, vice-president in charge of sales. Other important changes in the sales organization include appointment of N. W. Foy, formerly Chicago district sales manager, as assistant general manager of sales; and of W. J. Hanna, formerly assistant district sales manager at Detroit, as Chicago district sales manager, succeeding Mr. Foy.

A. E. Walker

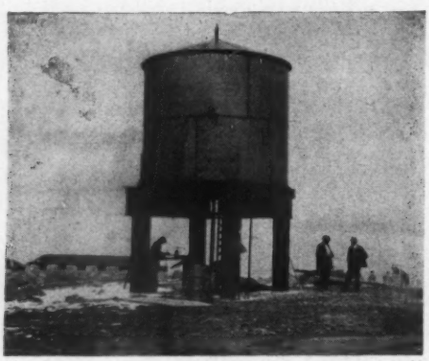
Prior to serving as assistant vice-president in charge of sales for Republic Steel Corp., Mr. Walker was general manager of sales of the Republic Iron and Steel Co. He came to this office in 1928, following a short period as assistant general manager of sales of the same company, a position to which he was appointed when Republic absorbed the Trumbull Steel Co. in 1928. Mr. Walker is a graduate of the University of Michigan. He has been associated with the Ritter-Conley Co. and the La Belle Iron Works, and came to the Republic company in 1916 as assistant manager of pipe sales. In 1919 he was made assistant general manager of pipe sales, where he served until the time of the Republic-Trumbull merger.

Portland Utilities Employees Attend Sales Session

Approximately one thousand employees of the Northwestern Electric Co., Portland Gas and Coke Co., and Pacific Power and Light Co., met February 13 in an all-day sales session in the auditorium of the Public Service Building, Portland, Ore. Harold F. Smiddy, commercial manager of the Electric Bond & Share Co., parent company of the organizations, was among the important speakers at a luncheon sponsored by the utilities, and to which appliance dealers were invited to attend with utility members. Paul B. McKee is president of the three Portland companies.

Resume of 1933 Rocky Mountain Oil and Gas Operations Published

C. E. Shoenfelt, oil geologist, is the author of "Rocky Mountain Oil and Gas Operations for 1933," published by Petroleum Information, Inc., Denver, Colo. The work is a resume of developments of the past year in the oil industry in the Rocky Mountain region, assembled in statistical form. Included among the subjects covered is gas discovered in new horizons in old fields, and Rocky Mountain oil and gas pipe lines with special tabulations of Colorado, Montana, New Mexico, and Wyoming oil fields.



Still a Settin' on Top of the World

—Safe under a single 7 year old coating of

NO-OX-ID IRON RUST The Original Rust Preventive

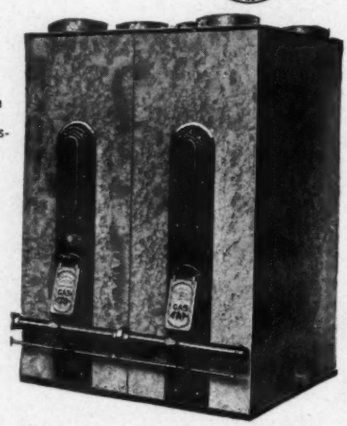
This "top of the world" tank on the summit of Pike's Peak, Colorado, property of the Cog Wheel Railroad was coated with NO-OX-ID in August, 1927. The last report we have states, "Its condition was perfect."

That is why NO-OX-ID is so well liked. Long lived. Thoroughly reliable. Easily applied. Economical.

Recommendations and estimates submitted gladly on new or reconditioning pipe line work, gas holders and accessory equipment. Inquiries invited.

DEARBORN CHEMICAL COMPANY

Los Angeles: 807 Mateo Street, Phone TRinity 3385
San Francisco: 421 Bryant St., Phone SUtter 8688



We make a complete line of gas-fired boilers, pressed steel and cast furnaces.

STANDARDIZED design and sectional construction of Mueller Gas Era Furnaces simplify both stocking and installation. Note the compact, simple assembly.

—and write for further details direct to:

L. J. MUELLER FURNACE CO.
2008 W. Oklahoma Ave. Milwaukee

MUELLER GAS ERA FURNACES

A Modern School of Gas Cookery

(Continued from Page 15)

ently pasted on a standard 3 x 5-inch recipe card which is now used in many modern kitchens.

The lectures have included Oven Dinners, Pies, Salads and Vegetables, All-In-One-Dish-Meals, Meats and Cakes. Such demonstrations effectively bring to the attention of the housewife the baking, broiling, time-saving, leisure-promoting virtues of the new automatic, clock-controlled gas ranges. Top burner cookery—boiling, simmering, deep-fat frying—receive particular attention, and practical hints are given on care of ranges.

Economical methods are stressed in the Modern School of Gas Cookery, but very special attention is given to those departments of food preparation where the gas range may be in operation for hours at a time. These include roasting, baking, soup-making, canning, home making of jellies and jams, all of which contribute to active load-building.

Diet menus, preservation of vitamins—in fact every item of food preparation which is of vital interest to the 1934 housewife—find their places on the programs of these modern, up-to-the-minute cooking schools. Every holiday—Valentine's Day, the birthdays of George Washington and Abraham Lincoln, St. Patrick's Day, Good Friday, Easter—is a party occasion. The Modern School of Gas Cookery acknowledges each festive day with timely and colorful dishes which embody the newest cookery ideas.

Broiling, which reaches real perfection when performed on gas ranges, also provides an unique opportunity to use the oven which, during the broiling process, is heated to a temperature of 550 degrees. Cooking School audiences are taught that prunes, or other dried fruits which have been soaked over night, may be cooked to a delightful tenderness on the descending oven temperature. Of course, after the broiling work has been completed, the gas is turned off. Stored oven heat also furnishes an excellent opportunity to "warm over" dishes.

The economical use of the modern gas range oven is aptly illustrated when four vegetables are cooked using the one burner only. In this demonstration, vegetables which require the same length of time and the same temperature are used, such as artichokes, beets, carrots and cabbage.

During cooking operations on the platforms of the various schools, the beauty and practicability of the modern, automatic, clock-controlled gas ranges are in evidence every minute. No matches to strike; no pilot light buttons to push; a flood light that brilliantly reveals the interior of top-burner cooking vessels; the perfect dependability of the oven heat control—these are vividly impressed upon those housewives whose cooking equipment is not modern and up-to-date.

Paul Evans to Dana Point

Paul Evans has been appointed manager of the San Diego (Calif.) Consolidated Gas and Electric Co.'s Dana Point district office, succeeding George Ferguson.

"MODERNIZE as you repair"

THE SPRAGUE METER COMPANY

BRIDGEPORT, CONN.

Los Angeles, Calif. San Francisco, Calif.

Davenport, Iowa

Newark, Ohio. Houston, Texas.

Engineers and Constructors

Services

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Semet-Solvay Engineering Corporation

40 Rector St. New York, N. Y.

NEW *Sales Literature*

Now Available!

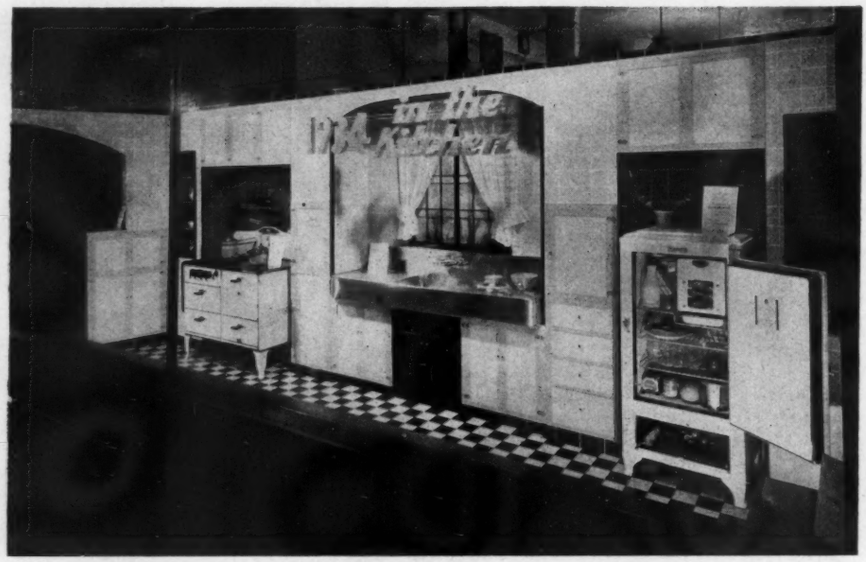
Pacific
GAS HEATING HEADQUARTERS

Our Line for 1934!

- FLOOR FURNACES
- CABINET HEATERS
- WALL HEATERS
- GAS STEAM RADIATORS
- RADIANT HEATERS
- WATER HEATERS
- GRAVITY FURNACES
- FORCED AIR FURNACES
- UNIT HEATERS

The Outstanding Gas Appliance Line of the Pacific Coast. Write for complete information on any or all items . . .

Pacific Gas Radiator Co.
Main Office and Factory
Huntington Park, California
Oldest and Largest Manufacturer of Gas Heating Appliances in the West



Modern kitchen display used by Southern California Gas Co. (Courtesy of "Gas News").

Kitchen Window Display Serves Double Purpose

FROM January 1 to February 10 the effective window display above was shown at the headquarters office of the Southern California Gas Co. in Los Angeles, Calif. Tying in with the companys' program for kitchen modernization this kitchen set was designed in accordance with good kitchen technique, specifications of American Gas Association and other sources being followed. Night lighting in color was used with the window. Ranges were changed each week, allowing cooperation with numerous manufacturers.

The same display was used as a background for demonstrators at a three-day cooking school held during February in Westwood Village, the set being erected on the stage of the Fox West Coast Theatre. The school was conducted in cooperation with a community newspaper, the gas company furnishing the home economist and equipment. Close to 1000 women attended this school.

Unusual features of Electrogas **FLOOR FURNACES**

1 Compact hollow fins
2 Streamlined 98% vertical
3 Large heating area
4 No flat surfaces
5 Open base
6 Built-in diverter
7 Easy to clean thru top

also **BASEMENT FURNACES**

Electrogas
FURNACE & MANUFACTURING CO.
4575 Bayshore Blvd., *San Francisco*
164 South Central Ave., *Los Angeles*

Kennedy Rejoins Standard; Hall Superintendent for Stanpac

L. T. Kennedy, former superintendent of Standard Pacific Gas Line Inc., rejoined the pipe line department of the Standard Oil Co., effective February 1. A. E. Hall, formerly of the Coast Counties Gas and Electric Co., Santa Cruz, Calif., succeeds Mr. Kennedy as superintendent of Standard Pacific Gas Line Inc.

Coralville, Iowa to Vote on Natural Gas Franchise

A special election has been called for March 26 to vote on the granting of a franchise to the Iowa City Light and Power Co. for the construction of a natural gas distribution system in Coralville, Iowa. Carleton H. Myers is Iowa City manager of the company, which is a subsidiary of United Light & Power Co., Chicago, Ill.

Stockton Granted Franchise To Serve Farming District

R. L. Stockton of Bakersfield, Calif., on February 19 was granted a franchise to operate a domestic and commercial natural gas service in the Arvin-Weed Patch districts by the Kern County Board of Supervisors. The franchise is to be submitted to the California Railroad Commission for approval.

The franchise covers approximately 35 sections in the Arvin farming district, south and east of Bakersfield. Approximately 400 domestic meters will be served. A 12-mile, 4-inch pipe line will be constructed to bring the gas from the Mountain View fields. L. E. Town is construction and maintenance engineer for the project; J. W. Heard, Jr., is attorney.

J. E. Holmes and Wm. Neckerman on Southwestern Inspection Trip

J. E. Holmes, manager of the pipe division of Republic Steel Corp., Youngstown, Ohio, and Wm. Neckerman, vice-president of the corporation, returned to Youngstown early in February following a month's trip through Louisiana, Texas, Arizona and California. In Arizona they inspected the Western Gas Co.'s recently completed Tucson-Phoenix extension for which Republic Steel Corp. furnished a portion of pipe.

DIRECTORY

Byllesby Engineering and Management Corporation

Wholly-owned subsidiary of
Standard Gas and Electric Company

231 South La Salle Street, Chicago
New York Pittsburgh San Francisco

• HYDRAUGER •

MODERN HORIZONTAL BORING MACHINE

For Underground Installation of Pipe and Conduits. Avoids damage to costly Pavements and saves time. Send for Bulletin.

HYDRAUGER CORPORATION, Ltd.

343 Sansome Street • San Francisco, California

QUIET

GENERAL MAGNETIC GAS VALVE FEATURES:
Electric Hum Eliminated, ½-3" sizes. Low and High Voltage. Built for High Pressure Gas. Made in slow-opening types. Simple in Design—Infallible in Operation—Low in Price.

GENERAL CONTROLS CO., LTD.
1539 Folsom St. San Francisco

DANIEL ORIFICE FITTING

MEETS THE SEVEREST OPERATING CONDITIONS
LET US TELL YOU OF OUR LATEST DEVELOPMENTS

DANIEL ORIFICE FITTING CO.
1900 SANTA FE AVE. LOS ANGELES

SHEER 31-A MOTOR GAS VALVE
Now Entering Its Third Year
LEADS IN PERFORMANCE AND LOW PRICES

Also Hi-Lo Gas Valve, Step-Opening Gas Valve, Thermostats, Safety Pilots, Limit Controls, Space Heater Regulators, Humidifiers, Etc. . . . .
WRITE FOR CATALOG
H. M. SHEER CO., QUINCY, ILL.

GAS PIPE LINE MAP

Compiled by the Editors of WESTERN GAS
Size 45" x 45"

The most comprehensive published; covers the 22 western states in detail. Gives gas fields, names of natural gas communities; sizes of pipe lines and names of pipe line companies.

PRICES:
Printed on Cloth, $3.50

WESTERN GAS
810 South Spring St. Los Angeles, Calif.

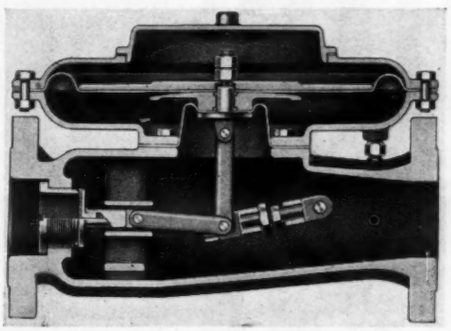
Greater Capacity
Better Performance
Increased Efficiency
For INDUSTRIAL GAS CONTROL

★ The requirements in industrial gas regulation are rigid. One iron-clad requirement is: CONSTANT OUTLET PRESSURE. REYNOLDS Industrial Regulators, proved by performance in actual operation, guarantee smooth, constant outlet pressure even though inlet pressure is decidedly jumpy. But, that is not all. Numerous other outstanding features make them superior for this type of installation. Some of them are: removable valve pocket and orifices, side hand hole, streamlining that directs the gas flow, increasing the capacity, *pressure reduction from pounds to pounds and pounds to inches W. C., single or double valve construction, and equipped with or without pilot control.

Regulators are manufactured in dead weight adjustment and spring type adjustment in either single or double valve construction.

*Body of the Regulator is so machined that a pounds to pounds diaphragm casing or a pounds to inches diaphragm casing may be used, or interchanged.

Write for Details



REYNOLDS Toggle Type Flanged Regulator for the reduction of pressure from pounds to pounds or pounds to inches W.C.

Reynolds Branch Offices:
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Kansas City, Missouri
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Representatives:
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REYNOLDS PRODUCTS

GOVERNORS—Intermediate Pressure, Triple Outlet, Holder, Toggle Type Street.
REGULATORS—High Pressure Service, Low Pressure Service, Intermediate Pressure, High Pressure Line, Single and Double District Station.
VALVES—Automatic Quick Closing Anti-Vacuum, Relief, Cut-Off.
SEALS—Mercury and Dead Weight.

REYNOLDS GAS REGULATOR CO.
ANDERSON, INDIANA, U. S. A.

GAS CONTROL SINCE 1892

The heater that smiles while it warms

FRASER

Radiant Front Console

Imagine a circulating heater with all the added advantages of a cheerful open fireplace. It is absolutely new—a revolutionary contribution to gas heating.

Manufactured by

Fraser Furnace Company
Stockton, California

Distributed by

H. R. Basford Company
San Francisco Los Angeles

SOUTH CHESTER STEEL PIPE

Excels for Gas Service

The unusual care given to accuracy of diameter and welding qualities, makes Chester Pipe a favorite for gas lines.

SOUTH CHESTER TUBE CO.
Chester, Pa.

Program Set for Joint Sessions at Memphis

PROGRAM arrangements for the joint sessions being held by the Southern Gas Association and the Southern-Southwestern Gas Regional Sales Conference of the A.G.A. are now being brought into final form. Sessions will be at the Peabody Hotel, Memphis, Tenn., on March 21, 22, and 23. As far as arranged the program includes the following:

GENERAL SESSIONS

The Future of the Natural Gas Business—F. L. Chase, vice-president, Lone Star Gas Co., Dallas, Texas, and Chairman of the Natural Gas Department, A.G.A.

Benefitting from Cooperative Effort—Kurwin R. Boyes, secretary of the American Gas Association, New York, N. Y.

Some Southern Sales Problems—Rawson Collier, Southern Natural Gas Corporation, Birmingham, Ala.

SALES CONFERENCE

Wednesday, March 21, 2 P.M.

Sales Planning for Better Times:
(a) For Smaller Companies—J. F. Orr, United Gas System, Houston, Texas.
Discussion—C. L. Trevitt, Community Natural Gas Company, Dallas, Texas.
(b) For Larger Companies—C. B. Gamble, Birmingham Gas Co., Birmingham, Ala.
Discussion—C. L. Trevitt, Community Natural Gas Co., Dallas, Texas.

Developing Gas Refrigeration Through Utilities and Dealers—E. C. Whitcomb, Lone Star Gas Co., Fort Worth, Texas.
Discussion—E. N. Avegno, New Orleans Public Service Inc., New Orleans, La.; C. K. Patton, Dallas Gas Co., Dallas, Texas.

Present Day Industrial Developments—H. E. Randall, United Gas System, Houston, Texas; C. C. Tucker, Municipal Gas Co., Decatur, Texas.

Thursday, March 22, 2 P.M.

Operating Sales Departments on a Load Building Basis Rather than on an Appliance Basis—D. H. Levan, Jacksonville Gas Co., Jacksonville, Fla.
Discussion: W. E. Parrott, Memphis Power and Light Co., Memphis, Tenn.; R. C. Anderson, Mississippi Power & Light Co., Jackson, Miss.

Developing Appreciation and Sales of Automatic Water Heating Service—L. L. Baxter, Southern Union Gas Co., Fayetteville, Ark.
Discussion: Ed. Brewer, Atlanta, Ga.

Modernizing Our Service to Commercial Customers—J. M. Clann, New Orleans Public Service Inc., New Orleans, La.

Friday, March 23, 2 P.M.

Playlette on "Kitchen Modernization."

Importance of Promoting the All-Gas Kitchen—H. E. Dexter, Central Hudson Gas and Electric Corp., Poughkeepsie, N. Y.
Discussion: C. E. Dougherty, Chattanooga Gas Company, Chattanooga, Tenn.

Space Heating Possibilities:
(a) Through Radiant Heaters—W. F. Eve, Jr., Atlanta Gas Light Company, Atlanta, Ga.
Discussion: Vernon R. Brown, Lone Star Gas Co., Fort Worth, Texas.
(b) Through Vented Heaters—C. B. Wilson, Little Rock Gas and Fuel Co., Little Rock, Ark.
Discussion: O. A. Kinzier, Dallas Gas Co., Dallas, Texas.

TECHNICAL SECTION

Maintenance of Meters—C. L. Nairne, New Orleans Public Service Inc., New Orleans, La.

Natural Gas Change-Over Completed in Cedar Rapids

Change-over operations from manufactured to natural gas were completed in Cedar Rapids and Davenport, Iowa, early in February. The United Light and Power Engineering and Construction Co., Chicago, Ill., constructed the 40-mile, 10-inch line which extends north from the Natural Gas Pipeline Co. of America Texas-to-Chicago line near Ainsworth, Iowa, to bring natural gas to the Cedar Rapids Gas Co. The Cedar Rapids Gas Company, of which Mark Anderson is general manager, serves approximately 13,500 meters.

U. S. Pipe and Foundry Issues "Super-deLavaud" Booklet

United States Pipe and Foundry Co., Burlington, N. J., has issued a booklet entitled "Super-deLavaud Cast Iron Pipe," which describes an unique change in the method of manufacture of deLavaud pipe. Among the major advantages which Super-deLavaud is said to possess are: increased impact resistance, non-shattering characteristic, more ease in cutting and tapping, greater carrying capacity, and ease of assembly due to self-centering shoulder and bell. Copies of the booklet may be obtained by addressing the publicity department of the company.

Ingersoll-Rand Acquires General Electric Turbo-Blower Business

Ingersoll-Rand Co. has acquired the turbo-blower business of General Electric Co. and will consolidate it with its own turbo-blower department.

Ingersoll-Rand is a long-established manufacturer of blowers of medium and large capacities, for pressures ranging up to 100 lbs. General Electric has specialized in both single and multi-stage units for a variety of services in low and medium pressures. Ingersoll-Rand also secures an exclusive license under the various General Electric patents.

The line of blowers now offered by Ingersoll-Rand includes low pressure units for aeration of sewage, ventilating and air conditioning systems, blowing cupolas, atomizing oil for furnaces, furnishing agitation air for flotation work, and for raw water ice systems, operation of pneumatic conveying systems, and developing pressures and vacuums in handling manufactured gas.

The medium-pressure machines cover blast furnaces and converter blowing and gas booster work.

The manufacturing equipment previously employed by General Electric is being moved to Ingersoll-Rand's Phillipsburg, N. J. plant. Sales activities will be directed from Ingersoll-Rand Co.'s general offices at 11 Broadway, New York, N. Y.

Magic Chef

AMERICAN STOVE COMPANY

AS MODERN AS TOMORROW'S NEWSPAPER

MAGIC CHEF

GAS RANGE

SERIES 1900

with

ELEVATED BROILER

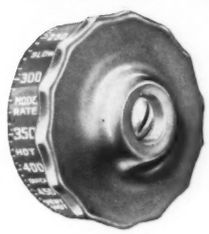
HERE'S a new Magic Chef series that will make an instant appeal to the modern housewife. In addition to all other advanced Magic Chef features, Series 1900 has an *Elevated Broiler* of the handy drawer type, located just under the manifold.

The broiler is entirely separated from the oven and has its own burner specially drilled to give a direct, even flame. Thus broiling can be done without interfering in any way with the operation of the oven.

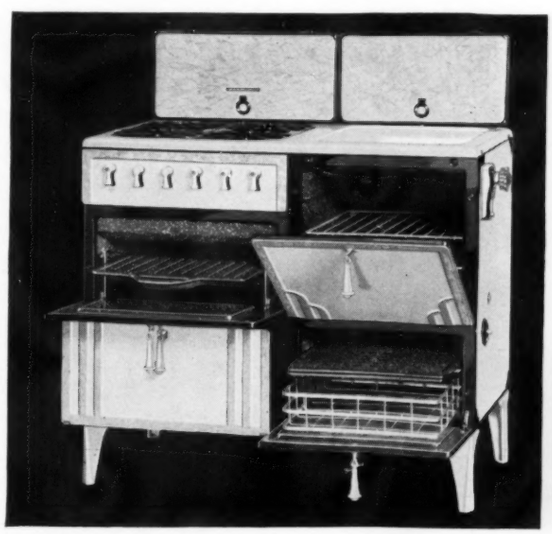
The elevated position of the broiler does away with awkward stooping, making broiling decidedly more comfortable and convenient.

The space beneath the oven, fitted with a special baffle to shut off excessive heat from oven burner and a spot welded plate basket, can be used either as a warming compartment or for utensil storage.

Series 1900 comes in four finishes—white with black trim, ivory with black trim, ivory with tan trim, ivory with green trim . . . Write for color illustrations and full description.



Look for the RED WHEEL
When you buy a MAGIC CHEF



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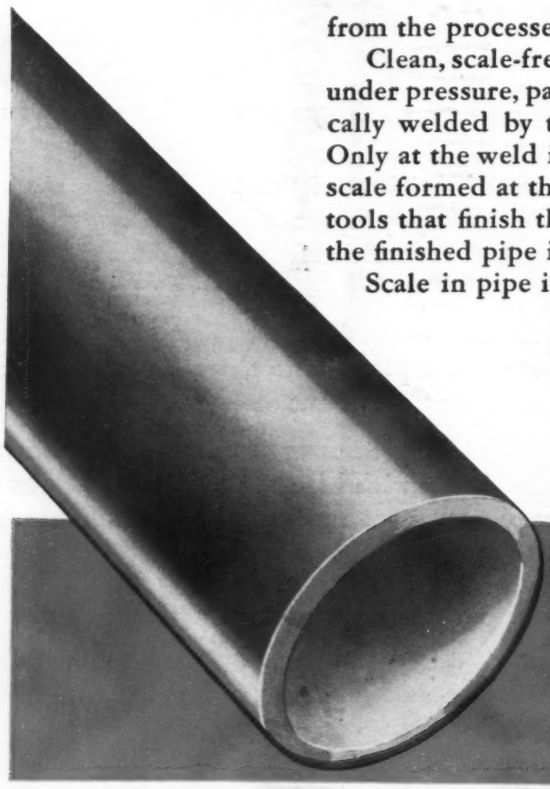
REPUBLIC ELECTRIC WELD PIPE IS MADE WITHOUT SCALE

This statement tells practically the whole story of the scale-free feature of Republic Electric Weld Pipe. There is no scale on the pipe, because it is made in a manner entirely different from the processes used in making other kinds of pipe.

Clean, scale-free steel strip is formed cold to a perfect round. The seam, under pressure, passes under two rotating circular electrodes and is electrically welded by the heat generated by the resistance of the steel itself. Only at the weld is the metal raised to a welding temperature. Any oxide scale formed at this point inside or outside is completely cut away by the tools that finish the weld to such a smoothness that locating the weld in the finished pipe is a difficult task.

Scale in pipe is often a nuisance. It clogs valves in line pipe. It cuts leathers in tubing. It accelerates corrosion in every type of service. So isn't it good judgment to steer clear of these possible difficulties by writing into your requisitions the name, Republic Electric Weld Pipe?

All the other features of this better pipe are fully described in Booklet 210-B. Write for a copy.



REPUBLIC STEEL
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